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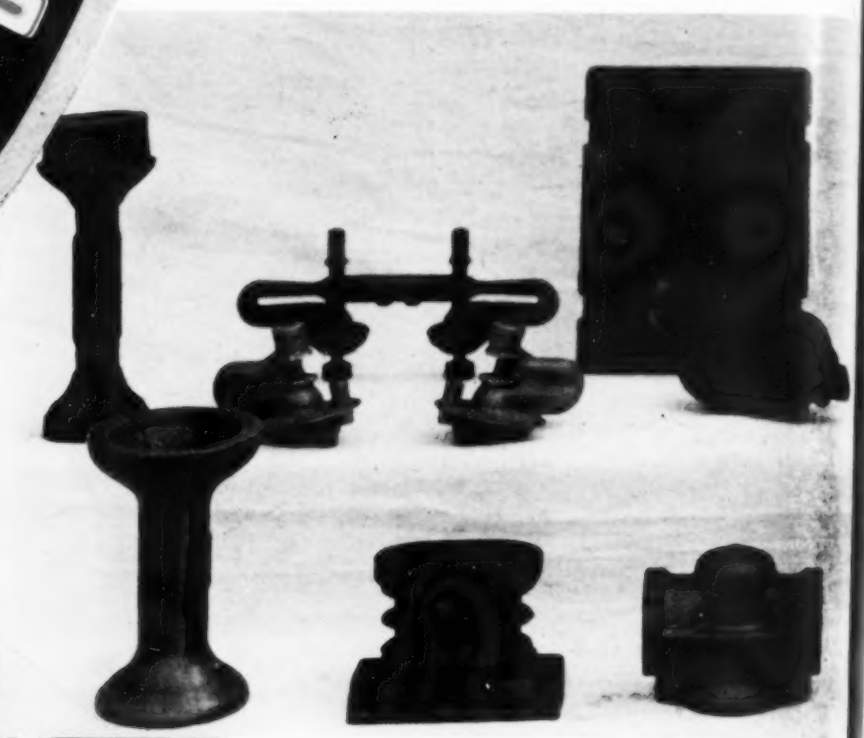

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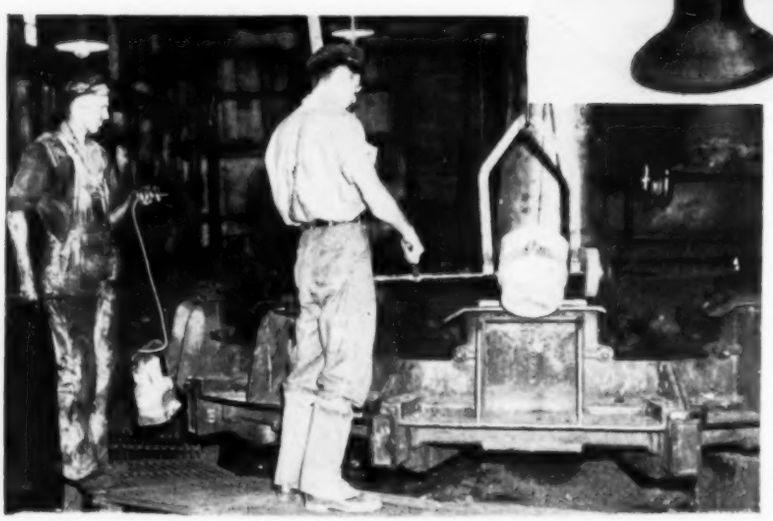

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EDITORIAL

Foundry Industry Operating at Highest Rate in Decade

PRODUCTION of castings in all four branches of the industry was stepped up rapidly during the past 60 days. Although many foundries now are operating at full capacity on government work and the need for castings for armament and related purposes continues to increase as the defense program slowly gains momentum, probably the largest demands made on the majority of plants still result from ordinary commercial needs for immediate consumption in further manufacturing processes. Only a slight tendency toward increasing inventories of castings seems apparent.

On the average, steel foundries producing miscellaneous castings are operating between 75 and 80 per cent of capacity. While plants making railway specialties lag somewhat behind that high rate, present activity among railroads indicates those foundries may reach an average operating rate of 75 per cent within the next 60 to 90 days. Use of steel castings as armor plate for tanks, as discussed in THE FOUNDRY for April, is increasing rapidly. Reports indicate that seven foundries now are producing cast turrets and cast hulls to be used in medium and heavy tanks for both Britain and the United States. Undoubtedly demands from that source will increase, especially with bottlenecks in the supply of rolled armor plate. A number of foundries are producing cast steel shells. Steel foundries also are making considerable marine work and miscellaneous castings for various types of war materiel.

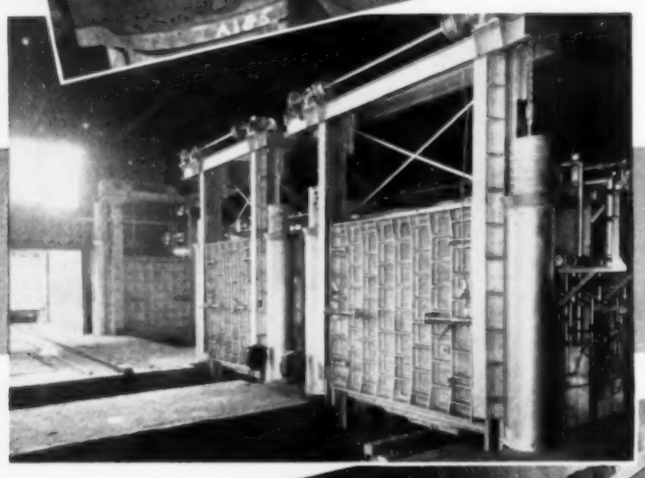
Malleable foundry industry is operating in the neighborhood of 70 to 75 per cent on the average, the orders coming in a small measure from defense needs, but chiefly from ordinary requirements. With the automobile industry producing cars at a rate far ahead of a year ago, demand for automotive malleable is extremely heavy. In defense work, malleable castings are being used on all motorized equipment and for a variety of applications on materiel. Shells of pearlitic malleable iron are being produced for a foreign government.

The gray iron foundry industry in all sections of the country is exceptionally busy with many plants operating at capacity. While the amount of defense business on direct contract with the government is small, a sizable tonnage of gray iron castings is being employed as parts of machines and materials purchased for the army and navy. Both regular and educational orders for shells and ammunition parts are being cast in gray iron for both British and American governments. Considerable defense work has reached nonferrous foundries, especially aluminum and magnesium shops specializing in aircraft castings. In general the nonferrous foundry industry also is operating at a high rate.

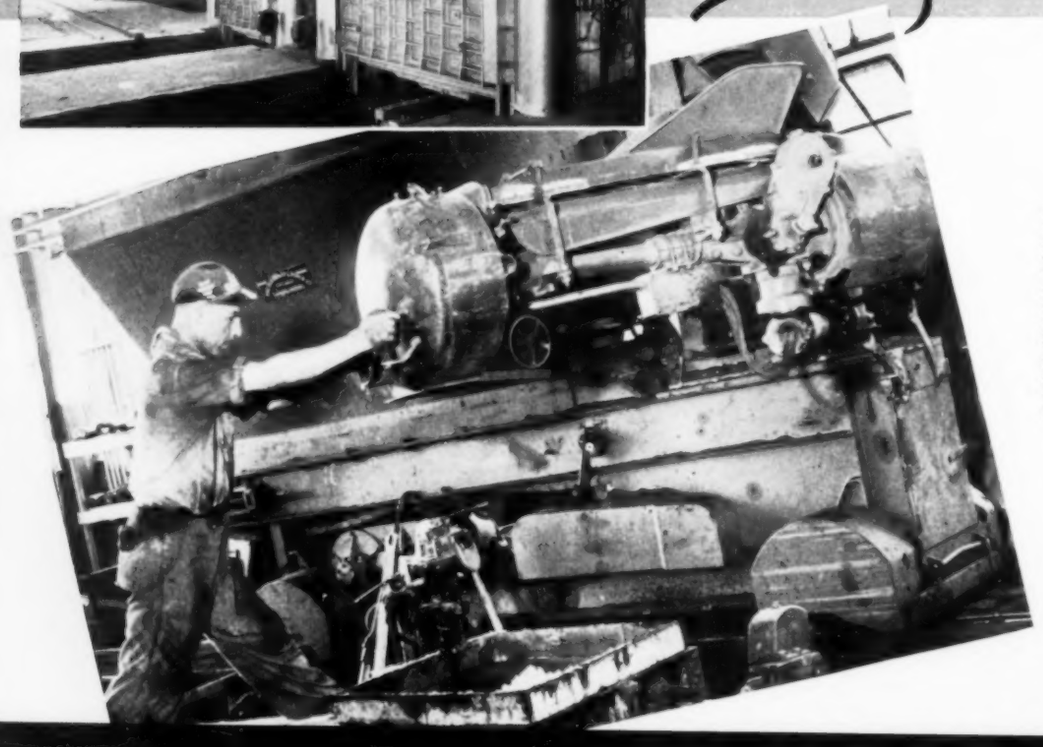
Releases for pig iron, coke and other necessary foundry materials are reported in heavy volume. While foundries are experiencing no difficulty in obtaining such materials in amounts needed from regular sources of supply, the possibility of securing materials from new sources is decreasing. In all probability, priorities will be established as the demand for these essential materials increases. In Canada priorities are in operation in connection with the supply of iron and steel. In steel, shells and munitions of war are receiving first call, buildings for plants producing arms have second place, and the various other uses are listed from there on down in relation to the importance to the war effort.

What will be the trend in the foundry industry if, as many believe, the demand for castings increases materially in months immediately ahead? As has been noted, a number of new plants have been built recently or now are under construction. Will further heavy demands result in an expansion program which will leave a heavy excess foundry capacity after the present emergency has passed? This problem concerns all foundrymen, and especially those with plants booked to capacity for months to come and who now are turning down further business. Customers must be assisted in finding plants capable of producing the types of castings desired. Present foundries must continue modernization programs so that increased demands for castings may be met.

Frank G. Steinebach
Editor



Steel Foundry Shows



RECENT completion of a large modern machine shop equipped with the latest type roll grinding and roll turning machines marks another step in the development and expansion of the Ohio Steel Foundry Co., with plants in Lima, and Springfield, O. Orders for rolls in iron, plain carbon and alloy steel in wide variety formerly constituting a comparatively small part of the company's business, now bulk large on the books and finally outgrew the facilities in the former roll turning shop.

Steady growth and expansion of the Lima plant, over a period of 33 years, establishment and expansion of the Springfield plant for a somewhat shorter period are due in large measure to the fact that the president and one of the founders of the company, John E. Galvin is a practical steel maker, member of a family of steel makers, soaked in the traditions, technique and progress of the steel making art. His father, John W. Galvin was the first man in America to learn how to make open hearth steel 70 years ago at the Bay State Iron Works, Boston. In 1875 the elder Galvin became the first open-hearth superintendent of the Pennsylvania Steel Co., plant at Harrisburg, Pa., now part of the Bethlehem Steel Co. For many years he was active with the Inland Steel Co. The son followed in the father's footsteps and progressed much more rapidly. He was born in Chattanooga, Tenn., in 1878 and after the usual preliminary school period he attended Wittenberg college, Springfield, O.

During vacation periods he worked in the steel

Fig. 1 (Top)—In chilled cast iron roll practice the metal from a large ladle is poured rapidly into a loam lined cast iron pouring basin clamped to the top of the flask. Metal enters the mold near the bottom. Fig. 2 (Center)—Modern annealing ovens. Fig. 3 (Left)—Molds are formed under sandslinger

plants where the working days were 7 per week and where the day shift worked 11 and the night shift 13 hours per turn. At one time or another he had a go at practically every job in the mill. It has been many a day since he stepped up to a flaming doorway and pitched dolomite an incredible distance from the end of a shovel to repair the bottom, the end or sidewalls of a furnace after a heat. He has not made up the tap hole or tapped a heat, or thrown bags of coke or alloys into a ladle in recent years and he has not manipulated the levers of the charging machine as they say on the charging floor for quite a spell.

After leaving college, he went to work in the open-hearth department of the Illinois Steel Co., South Chicago. He was promoted to charging car operator, pit foreman, night superintendent and then acting day superintendent. Later he became assistant superintendent of the Peru Steel Castings Co.; acting manager of the Pittsburgh Works, American Steel Foundries, and later was transferred to the Franklin, Pa., works of the same company.

Following his flight up the industrial ladder the young foundryman at the age of 29 paused for a moment to review the situation. Here he was on the verge of entering the old age thirties. Instead of spending the remainder of his life toiling for others, why not put in a few licks for himself? He persuaded several men to join in a venture.

In February, 1907, the Ohio Steel Foundry was organized by John W. Kaufman, Columbus,

Steady Growth

By Pat Dwyer

Fig. 4 (Top)—Batches of sand are given a short preliminary treatment in a concrete mixer before they enter the regular muller. Fig. 5 (Center)—Part of the battery of annealing ovens in which the steel castings are heat treated. Fig. 6 (Right)—Sand roll molds are formed with a sweep instead of a pattern

O.; Harry Wright, manager of the Sharon plant, American Steel Foundries; J. E. Galvin, manager, Franklin plant, American Steel Foundries; L. A. White, president, Lima Locomotive Works; W. T. Argerter, secretary and treasurer, Lima Locomotive Works and Ira Carnes, director, Lima Locomotive Works. Erection of the plant was started in March, 1907 and one 15-ton open-hearth furnace was placed in operation in September of the same year, just one month before the 1907 panic started. A 25-ton furnace was added in 1909. Original capacity of the plant was 300 tons per month. In the intervening years the company has had its ups and downs in common with all other industrial establishments in the country, but capacity steadily has increased. Today the capacity of the Lima plant is 2500 tons of steel castings per month.

The company purchased the Bucyrus Steel Casting Co., in 1916 and operated it as a war facility until December, 1918, when it was closed and later dismantled and sold. As a personal venture in 1916 Mr. Galvin built the Blackwood Steel Foundry, Springfield and sold it to the Ohio Steel Foundry in 1917. A second foundry was built on the same property in Springfield in 1928 for making high nickel chromium castings. Known as the Fahrite division, it is about the largest and best equipped high nickel chromium alloy foundry in the country. The present article covers some of the principal features in the open-hearth plant at Lima. A second article to appear later will deal in a similar manner with the plant at Springfield where plain and alloy steels are melted in electric furnaces in two separate buildings.

The large group of buildings constituting the Lima plant occupy practically all of a triangular 30-acre property bounded on the east by a long, straight stretch of the Baltimore & Ohio railroad; on the west for a considerable distance by the property of the Westinghouse Electric & Mfg. Co.; and on the north by Fourth street. Spur tracks from the railroad enter the plant at several points to facilitate movement of incoming raw materials and outgoing finished castings. One spur enters the cleaning room, while a branch terminates at the shipping platform 36 feet outside the north end of the main foundry building. Another spur with branches runs

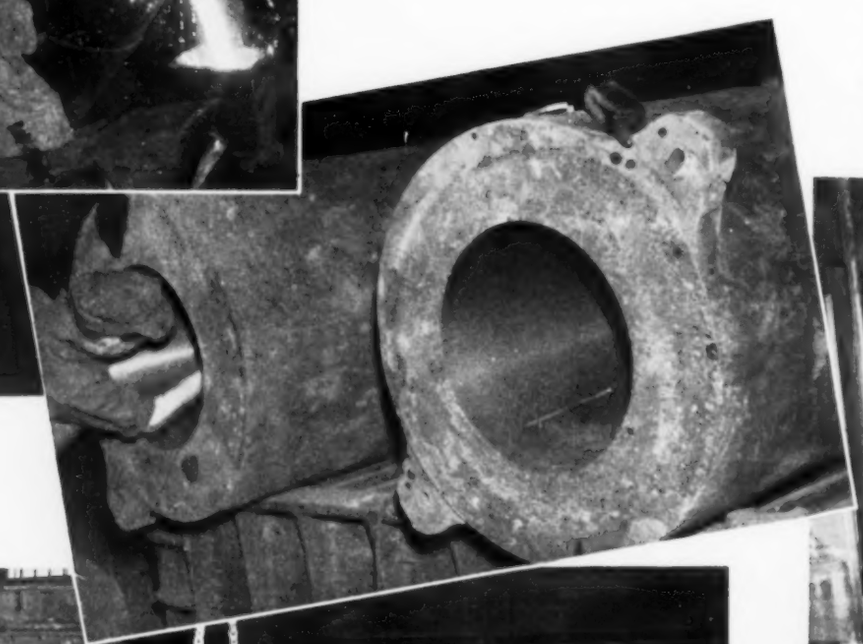


Fig. 7 (Top left)—Pouring men wear safety clothing. Fig. 8 (Center left)—Roll chill are cleaned, heated and blackwashed before they are set up. Fig. 9 (Left below)—Roll molds are loaded on cars and placed in drying ovens. Fig. 9 (Below)—Constant control of material is maintained in a well equipped laboratory

through the scrap yard and extends past the coal bunkers and sand bins. The latest branch to be laid down serves the new shop where the rolls are machined and finished. The main office of the company surrounded by attractive lawns, flowers and shrubbery is located at extreme northwestern corner of the triangle with a driveway leading to Fourth street.

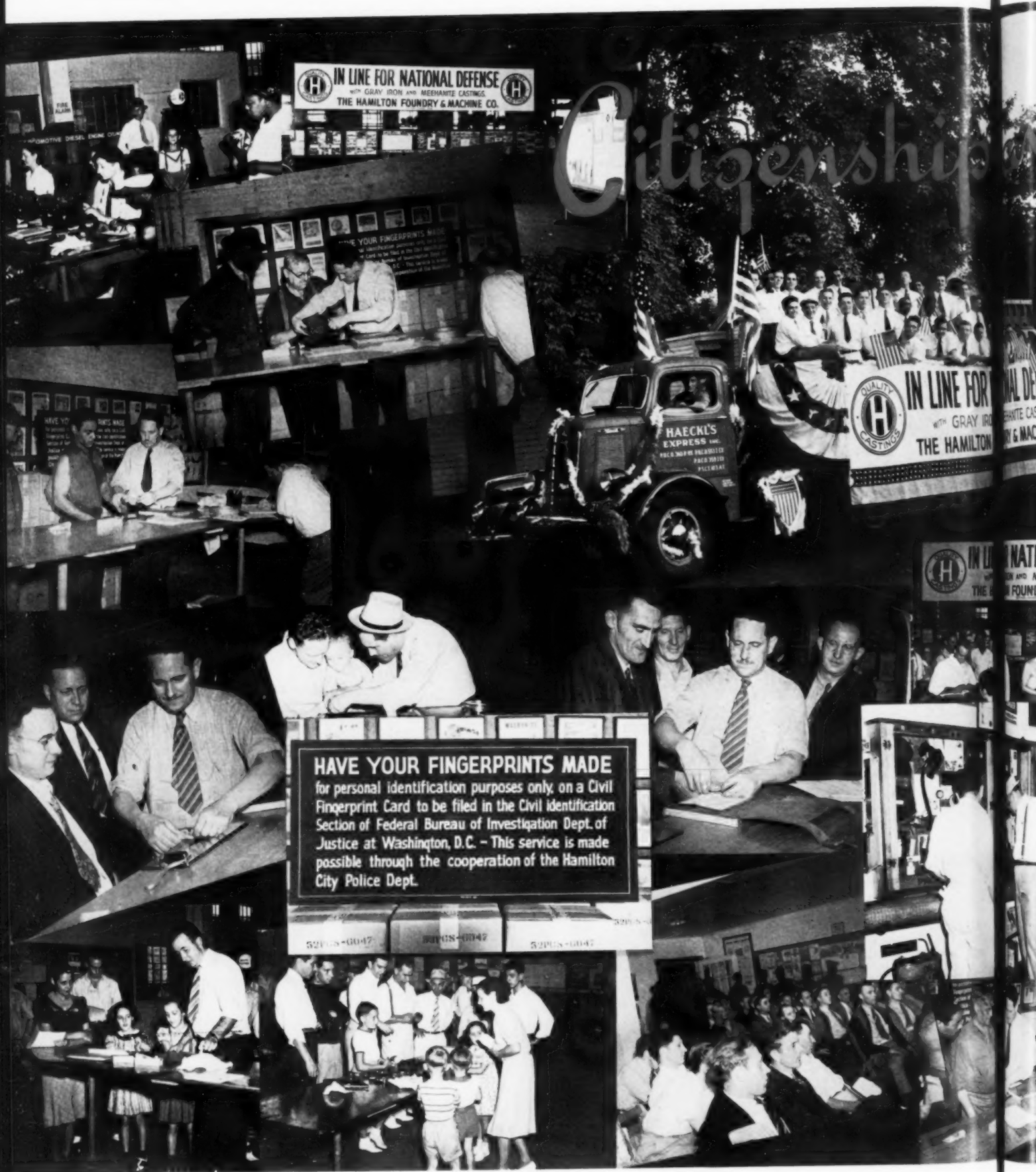
The Lima plant buys about 40 per cent of its electric power and operates its own boiler and power house for the generation of remaining electric current and for compressed air. This is done and the exhaust steam is used in the winter time for heating these buildings. Water for the boilers and for other purposes is supplied from a reservoir with a capacity of two million gallons. The boilers are fired with stokers fed from a large bunker located close to the roof of the building. In addition, this bunker feeds coal to a gyratory type pulverizer made by the Whiting Corp., Harvey, Ill. This powdered coal is fed through an underground pipe line to the 20-ton air furnace employed in melting the metal for the iron rolls.

This furnace is located in the yard outside the north end of the foundry building and is served by the yard crane. The furnace building is the essence of simplicity with corrugated sheet steel walls and roof mounted on wheels. In fine weather and during the furnace charging period the movable section of the roof is pushed out of the way. The crane then can be attached to the roof bungs. In this manner, practically all the high temperature, smoke and dust usually associated with the operation of an air furnace are eliminated. The crane with magnet attached is also employed to place the component parts of the charge in the furnace. After the charge is melted a ladle is placed in a concrete wall pit below the ground level at the front or west side of the furnace and the furnace is tapped into it. The crane lifts the ladle filled with metal and places it on a small car attached to a cable which pulls it into the foundry where the metal is poured into the roll mold or molds set up in a pit in the foundry floor.

A runway 600 feet in length encloses the scrap yard and supports a 15-ton crane with a span of 100 feet. The crane is employed to fill the cast steel charging boxes which then are pulled by a continuous chain

(*Please turn to page* 94)

Fig. 11 (Below)—Corner of the laboratory. Fig. 12 (Below right)—Ladle is lowered into a pit to receive metal from an air furnace. Fig. 13 (Right)—Shop handles large and small plain and intricate castings. Fig. 14 (Top right)—Molds for chilled rolls are set up in a pit for convenience in pouring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Personnel Relations

RECENTLY the city of Hamilton, O., staged a unique preparedness day program and parade, which was witnessed by approximately 50,000 people and included at least 5000 marchers. The Hamilton plan for national defense is composed of the following projects:

1. Aid to local national guard units.

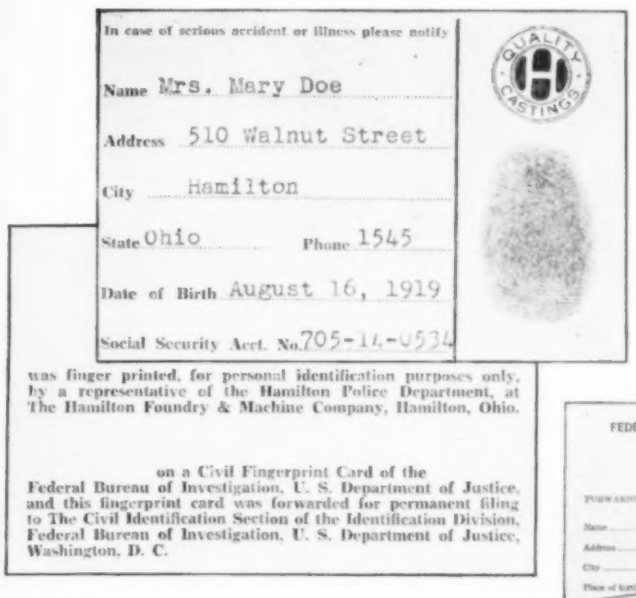
2. Vocational training for war time duty with co-operation of the school board, local industries, and state and federal governments.

3. Aviation training in co-operation with the Civil Aeronautical authority.

4. Furthering Americanism, combatting subversive elements through the American Legion and the Federal bureau of investigation.

Allen Hyer, Black-Clawson Co.; Lucian Kahn, Estate Stove Co.; J. Earle Peterson, General Machinery Corp.; and (*Please turn to page* 106)

Fig. 1—Various views taken at the displays arranged at the Hamilton Foundry & Machine Co. Top view shows the decorated truck entered in the parade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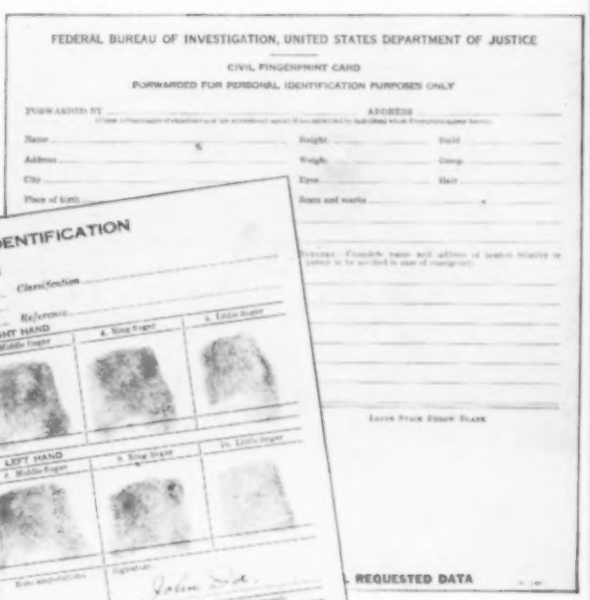
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Figs. 2, 3, 4 and 5—Finger print data were placed on cards shown in the accompanying illustrations

Gating NONFERROUS CASTINGS IS IMPORTANT

By N. K. B. Patch

TO AVOID misunderstanding in the discussion of gating nonferrous castings, let us repeat the definitions previously outlined in various articles which have been presented from time to time.

The *sprue* is that part of the entrance to the mold through which the metal enters and leads from the open air down through the cope to the main gate. The *gate* is that part of the whole gating system which leads the metal from the sprue to the cavities.

A *riser* is a cavity provided in the mold for storing a body of molten metal located so that it can feed a part of the casting as the latter solidifies. The base of the riser is attached to the casting through the riser gate, sometimes called the riser neck. A *blind* riser is one that does not come through the top of the mold to the open air, but in all other respects resembles the previously defined riser.

The *skim gate* is a specially designed gate whose object is to separate the flowing stream of metal so that the surface scum may be removed from the stream and thus permit the

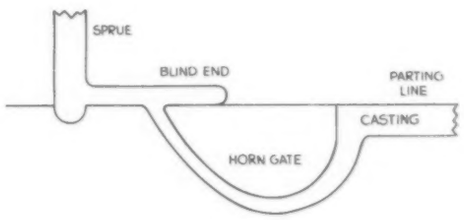


FIG. 1

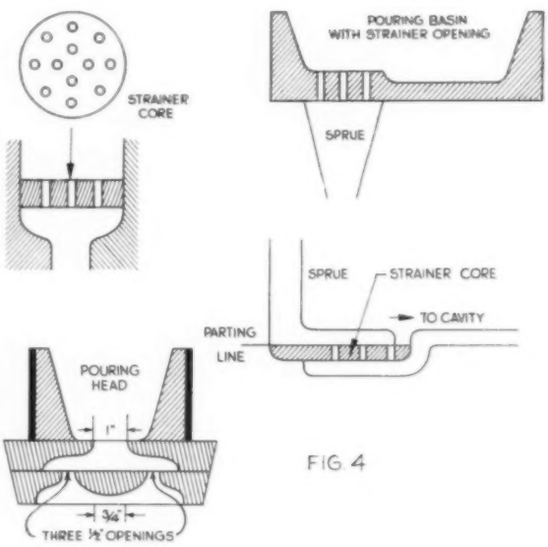


FIG. 4

Fig. 1—One type of horn gate incorporating pocket at bottom of sprue, blind end on runner, and large end of horn opening into mold cavity. Fig. 2—Firmly pressed pocket at bottom of sprue takes the brunt of the first entering metal. Fig. 3—Types of skim gates. At A is shown application of a triangular skimming core. Combination of horn gate and skimming riser is indicated at B while C depicts another method of using a skimming riser. One of the best arrangements of a skim gate is shown at D which includes skimming core and riser, and blind end at end of runner. Fig. 4—Various types of strainer gates. Fig. 5—Blind end on runner aids in collecting scum and dirt

skimmed metal to pass on into the mold. Many skim gates are more effective in theory than in practice.

A *pop gate* is one in which the metal is poured from the top of the casting and drops directly into the mold cavity without passing through the usual gates and leaders. *Horn gates* may be defined as gates so designed that the metal flows around a curved, horn-shaped entrance so located that the metal may be led into the mold cavity from the bottom as shown in Fig. 1 and the pattern for the gate may be withdrawn from the mold by rolling it out of the sand.

The first essential of good gating is to provide the right sized sprue having the necessary capacity to provide ample flow of metal for the casting but not being too big. A sprue that is big enough to permit the suction of air along with the flow of metal always will produce dirty, slushy and frequently, scum spotted castings. A sprue of the right size will permit pouring of the mold with an ample flow of metal and at the same time maintain a full sprue right to the top so that there is no chance of the sucking of air into the inflowing metal streams.

Furthermore, a sprue should not be so large as to develop spiral or circular spinning of the metal as it flows down into the mold cavity. That turbulent condition will develop defective spots in the castings due to the mixing of drosses with the metal, and even may cause the mixing of loosened sand with the metal, which later becomes lodged in the castings. Top of the sprue invariably should be well rounded and funnel-shaped so that pouring into it is an easy matter. It should not require an expert to direct the stream so that it pours freely, continuously and easily into the sprue.

In that connection, it might be well to emphasize that gating is a very important part of making good castings. However, a mold that has been made most expertly, in which the gates are of the very best, and all other items have been well taken care of, but into which the pouring has been poorly done, may produce bad castings. The causes of defective work may be intermittent or sloppy pouring, or a badly formed pouring spout on the (*Please turn to page* 90)

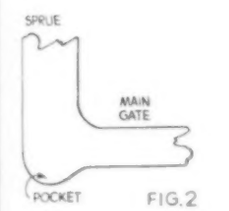


FIG. 2

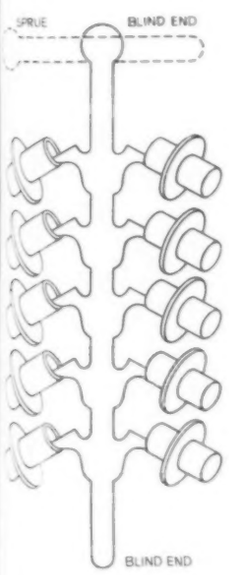


FIG. 5

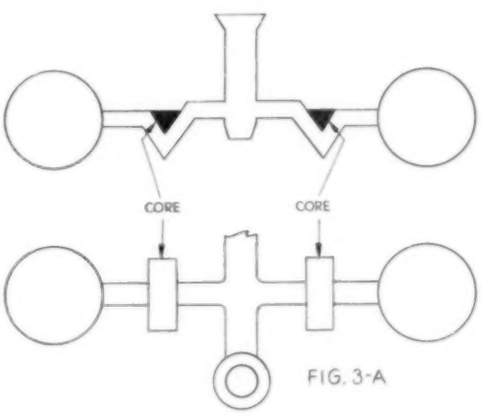
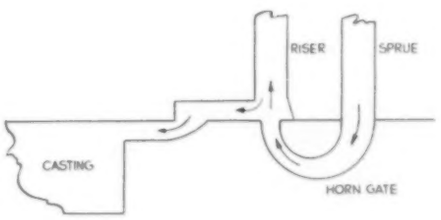


FIG. 3-A



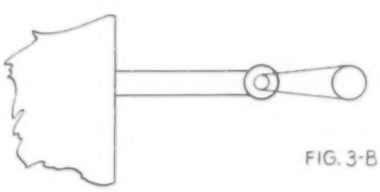


FIG. 3-B

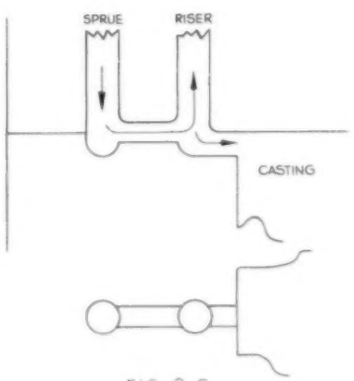


FIG. 3-C

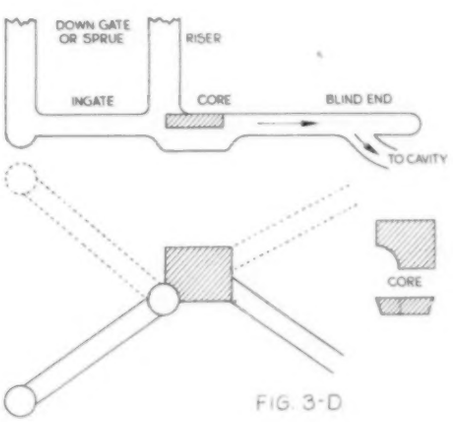


FIG. 3-D

SOME RECENT DEVELOPMENTS IN Iron and Steel

FOUNDRYMEN making irons that contain excessive amounts of oxides can use deoxidizers effectively to eliminate characteristic weaknesses and close the grain of the iron. A good example is shown in Fig. 19 which illustrates the dense structure that can be developed in a high total-carbon and high-silicon iron, which normally would exhibit a weak porous structure. The iron contained 3.33 per cent total carbon, 3.14 per cent silicon and 0.08 per cent sulphur.

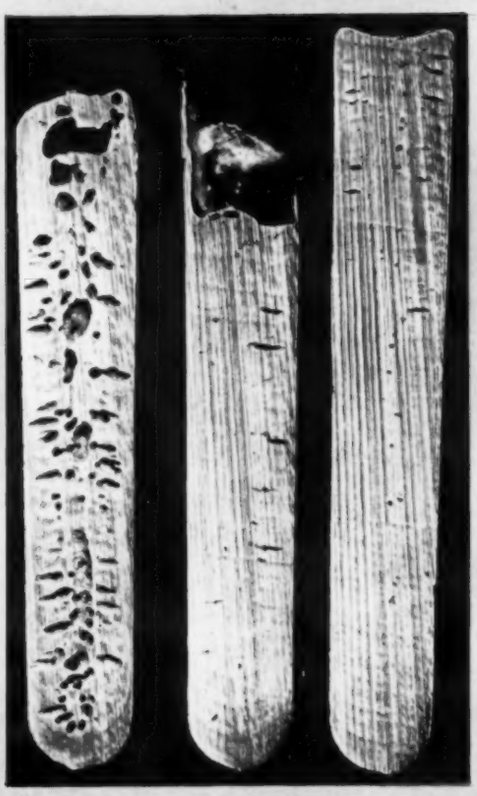
It was treated with medium-carbon ferromanganese, and the final analysis showed 1.67 per cent of manganese. Principal object of the manganese in this case was to correct difficulties encountered in the production of tight castings that had to withstand a pressure test. Reason for recommending medium-carbon ferromanganese as against the standard high-carbon 80 per cent grade is interesting.

Fig. 18—Ingots treated with hydrogen just before pouring at 2804, 2900 and 3114 degrees Fahr., respectively. Fig. 19—Addition of medium-carbon ferromanganese gives strong dense structure. Fig. 20—Effect of manganese additions on hydrogen treated specimens. Left to right manganese contents are 0.50, 1.00 and 1.50 per cent respectively. Fig. 21—Silicon steel ingots containing 0.80 per cent silicon were poured at 2786 and 2900 degrees Fahr. left to right

18.

19.

20.



21.

Castings

By R. C. GOOD
Electro Metallurgical Co.
New York

Addition of practically any alloy to cast iron or steel containing oxygen is believed to result in a union between oxygen and elements in the alloy. Ordinarily, manganese is regarded as an alloying element and as a deoxidizer causing the formation of manganese oxide, but it is forgotten that carbon also unites with oxygen to form a gas, carbon monoxide. Consequently, use of a medium or low-carbon grade of manganese should result in a sounder casting than would the use of a high-carbon alloy; and this is exactly what happens.

It is not difficult to melt a low-silicon, low total-carbon charge and then deoxidize the iron in the ladle to produce a high-test cast iron without resorting to the addition of substantial amounts of alloys or to heat-treatment. It is a familiar method and practical experience shows the plan to be quite feasible. Uniformity and reliability of results, however, demand that the alloy added to the iron in the ladle must be balanced, that is, the composition of the alloy must be such that its deoxidation products have the right degree of fusibility and solubility—both of which influence the characteristics of the cast metal.

In general, use of a special alloy containing various elements is more dependable than treatment with any individual element. Aluminum is a good degasifier but, unfortunately, it increases solubility of iron for reducing gases that are soluble at liquid temperatures but insoluble at low temperatures. Too much of this element

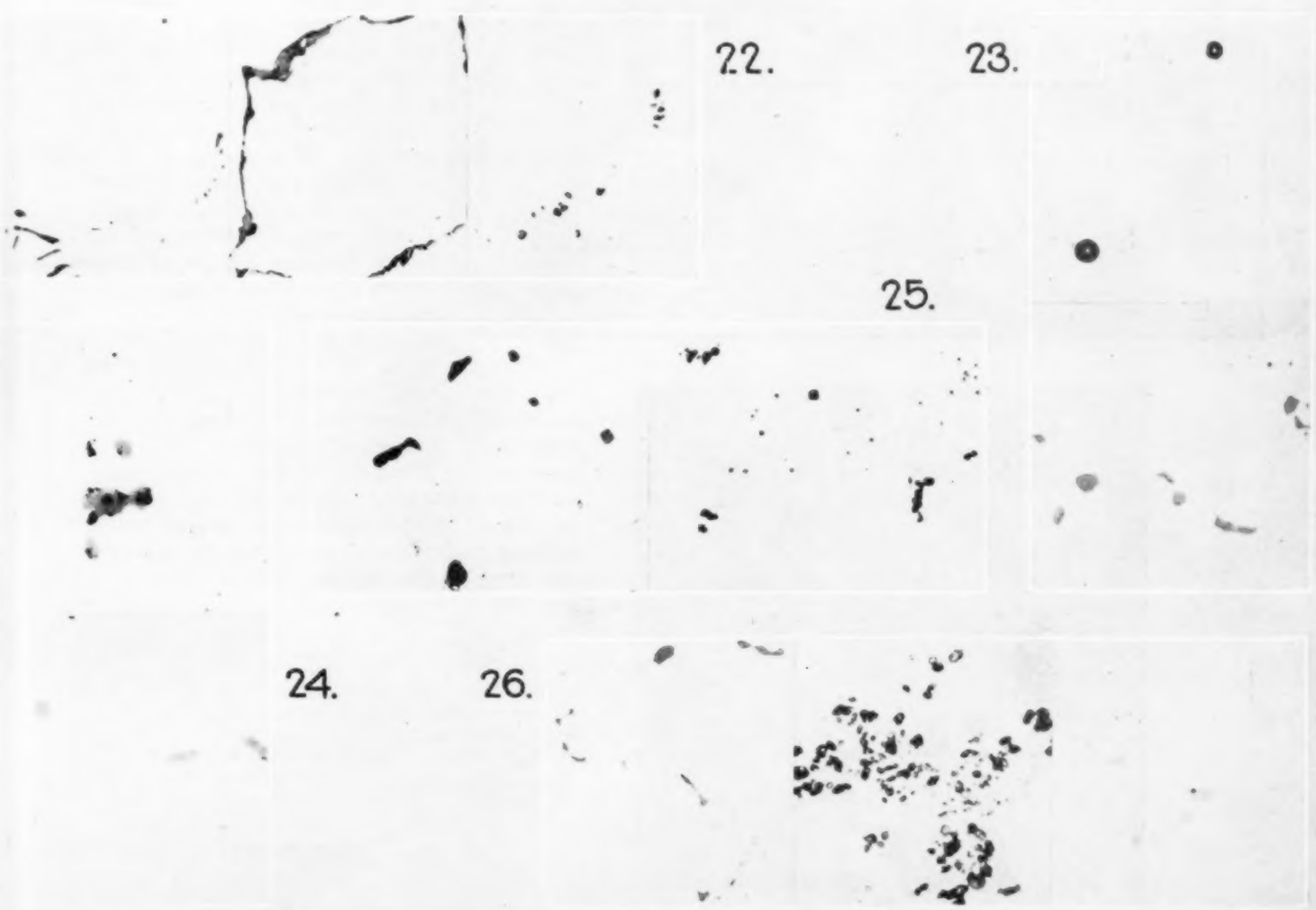
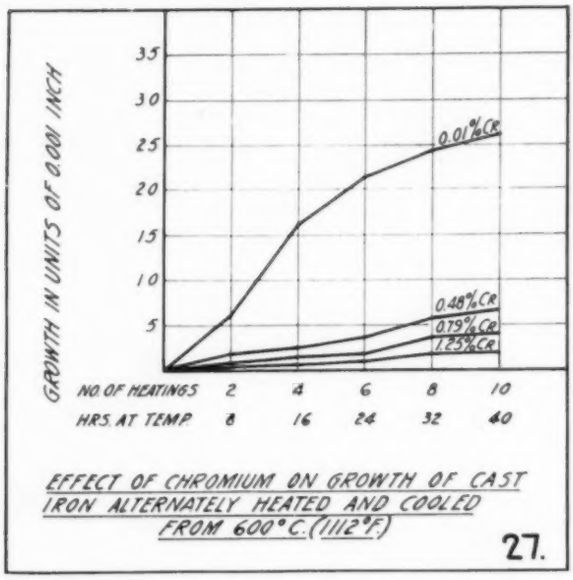
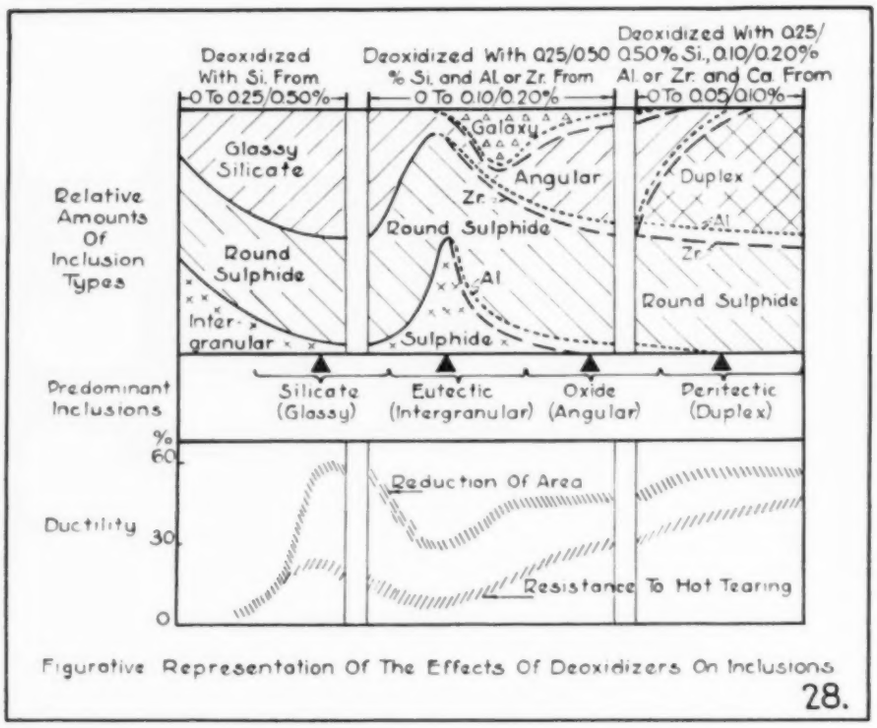


Fig. 22—Inclusions mainly eutectic with intergranular oxysulphide films. Any porosity due to gas from steel or oxidizing gas from mold. Ductility relatively poor. Fig. 23—Inclusions mainly silicates and round sulphides. Any porosity due to oxidizing gas from steel or mold. Ductility good. Fig. 24—Inclusions mainly peritectic. Any porosity due to mold gas. Ductility good. Fig. 25—Inclusions mainly alumina. Any porosity due to mold gas. Ductility fairly good. Fig. 26—Inclusions mainly galaxy type with binary eutectic sulphides. Porosity due to mold gas. Ductility relatively poor



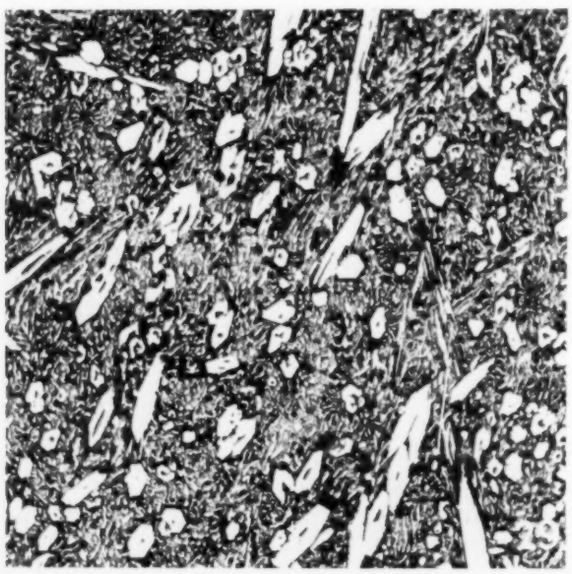
EFFECT OF CHROMIUM ON GROWTH OF CAST IRON ALTERNATELY HEATED AND COOLED FROM 600°C.(1112°F.)

27.



Figurative Representation Of The Effects Of Deoxidizers On Inclusions

28.



therefore is definitely harmful. Zirconium and titanium both form carbides after they form oxides, sulphides, and nitrides, so, when the residual oxygen before treatment is lower than normally found in iron made from a high-steel mixture, the zirconium and the titanium increase strength and hardness just as any other carbide-forming element does.

Our engineers have been experimenting with a silicon-base alloy containing small percentages of zirconium, manganese, calcium, aluminum, and iron. By the ladle addition of enough of that alloy to introduce 0.50 per cent of silicon to a charge containing 50 per cent steel scrap, a treated iron was obtained that shows a tensile strength of 50,000 pounds per square inch, a chill depth of 0.18-inch, a brinell hardness of 207, and a deflection of 0.51-inch. Radiographs of ¼-inch thick blocks indicated freedom from porosity. Combination of 50,000 pounds per square inch tensile strength with a 207 brinell hardness and a very low chilling tendency appears to have unusual possibilities.

Fig. 27 is a familiar diagram showing the influence of varying amounts of chromium in preventing the growth of cast iron at high temperatures. This iron is not what might be called oxidation-resistant, but growth up to 1200 degrees Fahr. definitely is inhibited. Fig. 29 shows a cupola-produced iron with 15 per cent chromium and 3.76 per cent total carbon. This iron is definitely resistant to oxidation at high temperatures but is brittle and can not be machined. In sections of 1-inch thickness or more, its resistance to shock is adequate for a number of applications.

Of the various troubles and problems confronting steel foundrymen, porosity crops up in every plant at frequent intervals and much has been written about it. Porosity may originate not only from poor molding practice, of which nothing is to be said here, but also from poor furnace practice, on which several comments are offered. (*Please turn to page* 103)

Fig. 27—Curves show effect of chromium on growth of cast iron alternately heated and cooled from 1112 degrees Fahr. Fig. 28—Influence of residual elements on proportions of various types of inclusions and on some of the corresponding properties of steel. Fig. 29—In thicknesses of 1 inch or more cupola iron containing 15 per cent chromium and 3.76 per cent carbon resists shock sufficiently for commercial use

MARKS PROGRESS IN MELTING GRAY IRON

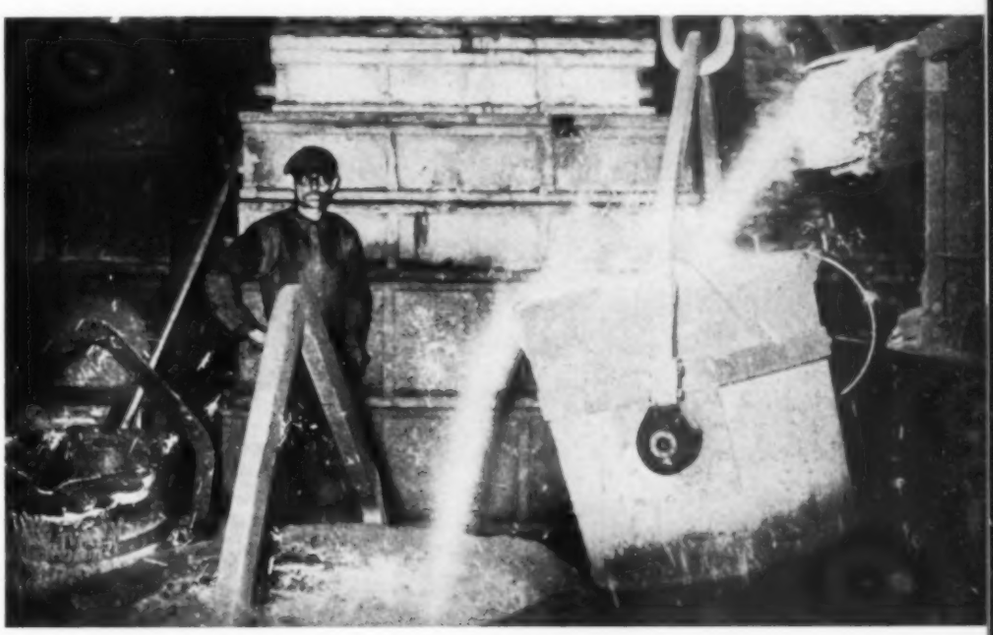
By Don J. Reese

International Nickel Co. Inc.
New York

THE jobbing foundry business constantly hears the demand for a better product but at no increase in cost. At times this demand has been a source of irritation, but in many instances the foundry can deliver a better product at no increase in cost or in some cases deliver a much improved product at a nominal increase in cost. It is not my purpose to strike a balance between the cost of making a casting and the price at which it is sold. This relationship involves many factors including salesmanship, good cost accounting, competition, suitability of pattern and molding equipment, suitability of the foundry for the type of casting to be produced, knowledge of consumer's problems, etc. However, an ideal melter is conscious of costs and knows that the desired goal may be approached in numerous ways, one of which is more economical than the others.

An ideal melter analyzes the prevailing conditions in his foundry area and the product his foundry wishes to produce. If he can purchase power for less than 3 mills per kilowatt hour, he probably will produce cast iron in an electric furnace, provided his company has sufficient capital to buy this type of equipment. If power costs from 12½ to 20 mills per kilowatt hour, he probably will melt in some furnace other than an electric furnace. On the West Coast, electric power is cheap while coke costs from $20 to $22 per ton. In the East and Middle West, power is not as cheap while coke costs $10 to $12 per ton. If his problem is one of supplying a mold conveyor with a continuous supply of metal, he knows that only one furnace used in the foundry industry, the cupola, melts continuously, whereas all other furnaces are batch types. There are various ways of combining batch type melting units and holding furnaces to provide a continuous supply of metal, but the practice generally is accomplished at some sacrifice in melting costs. Foreign foundrymen have combined blast furnaces with rotary furnaces to produce low total carbon pig iron. It is not uncommon in this country to blend metal from two cupolas, one melting a soft iron and the other a hard iron to produce an intermediary grade of gray iron. One such installation blends cupola melted malleable iron with metal from a cupola melting a high carbon, high silicon iron to produce a lower carbon, lower silicon gray iron.

Furnace combinations include blast furnaces and rotary furnaces, two cupolas, cupola and electric furnace, cupola and air furnace, etc. One automotive plant uses blast furnaces, cupolas, mixers, electric furnaces and air furnaces in one metal circuit.



Second ladle interposed between cupola spout and receiving ladle insures a thorough mixing of the molten metal. Photograph courtesy of the author

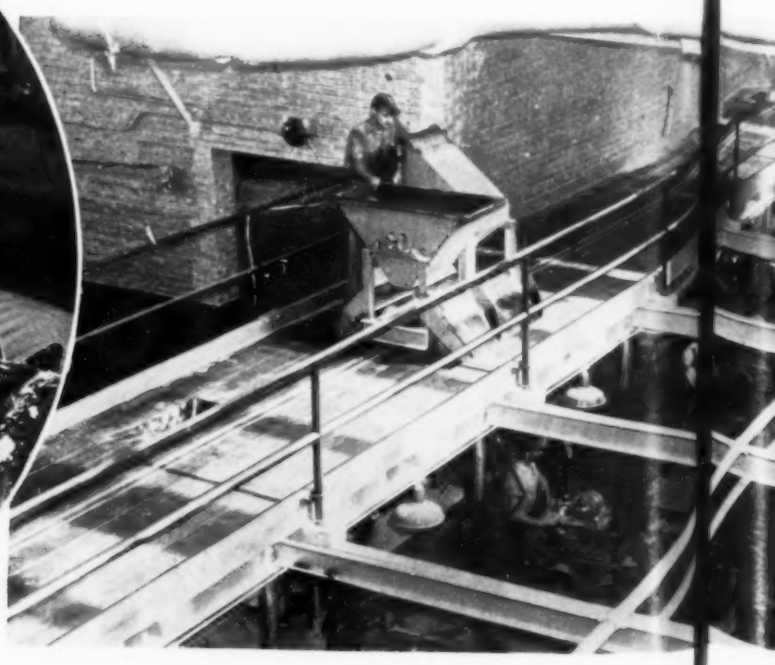
Furnaces are combined into duplexing arrangements where a large tonnage is involved. Where a foundry operated on a batch type melting operation switches to continuous pouring, and a mold conveyor system, it is inclined to use a duplex melting system. A foundry desiring to double or treble former output may switch to duplexing to permit reaching the new level with the least (*Please turn to page* 98)

Casting

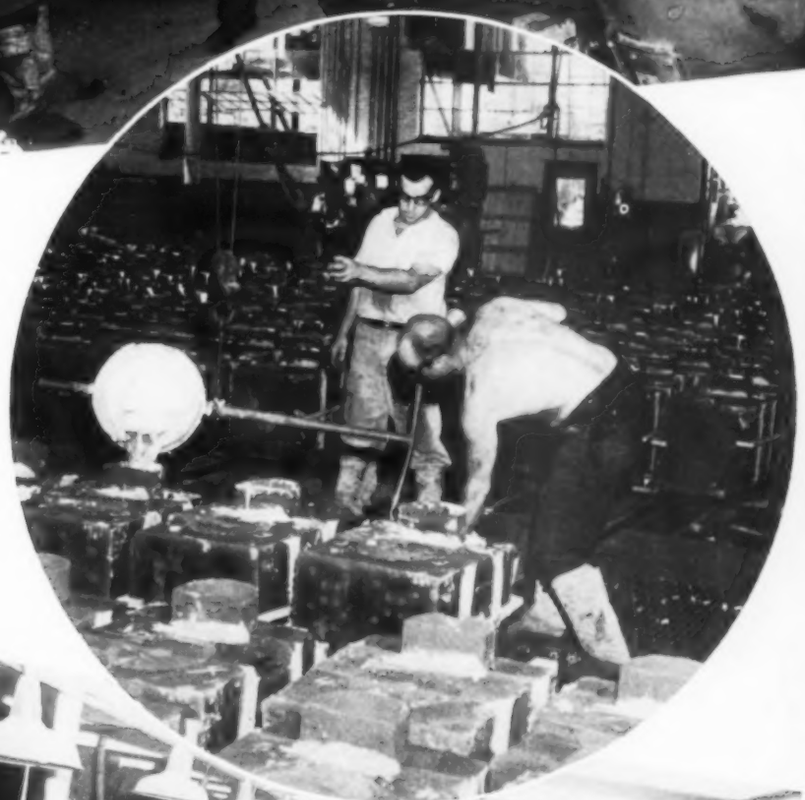
ALUMINUM CYLINDER HEADS FOR A

OPENING of plant No. 3 at Fairlawn, N. J., has increased the floor space of the Wright Aeronautical Corp., Paterson, N. J., to 2,300,000 square feet, more than double that of a year ago. Personnel has increased from 5000 to 13,000. The new unit is devoted to the production of aluminum alloy cylinder heads in which the external surface is covered with cooling fins 2 inches in depth and spaced almost as closely as the teeth on a comb. Manufacture of these extremely intricate castings on a production basis was not considered possible a few years ago.

The new foundry has facilities for the uninterrupted performance of all operations from the raw material stage to the finished cylinder head casting. Every step—from the construction of the sand molds and cores, through the pouring operations, the snagging off of excess metal, to sand blasting and heat treatment—is conducted on a straight line production basis. Automatic hoists, conveyors and rollers expedite the movement of molds, cores, molten metal and castings. Sand is fed to mold and coremakers through automatic chutes from a balcony surrounding the molding department.



AIRCRAFT



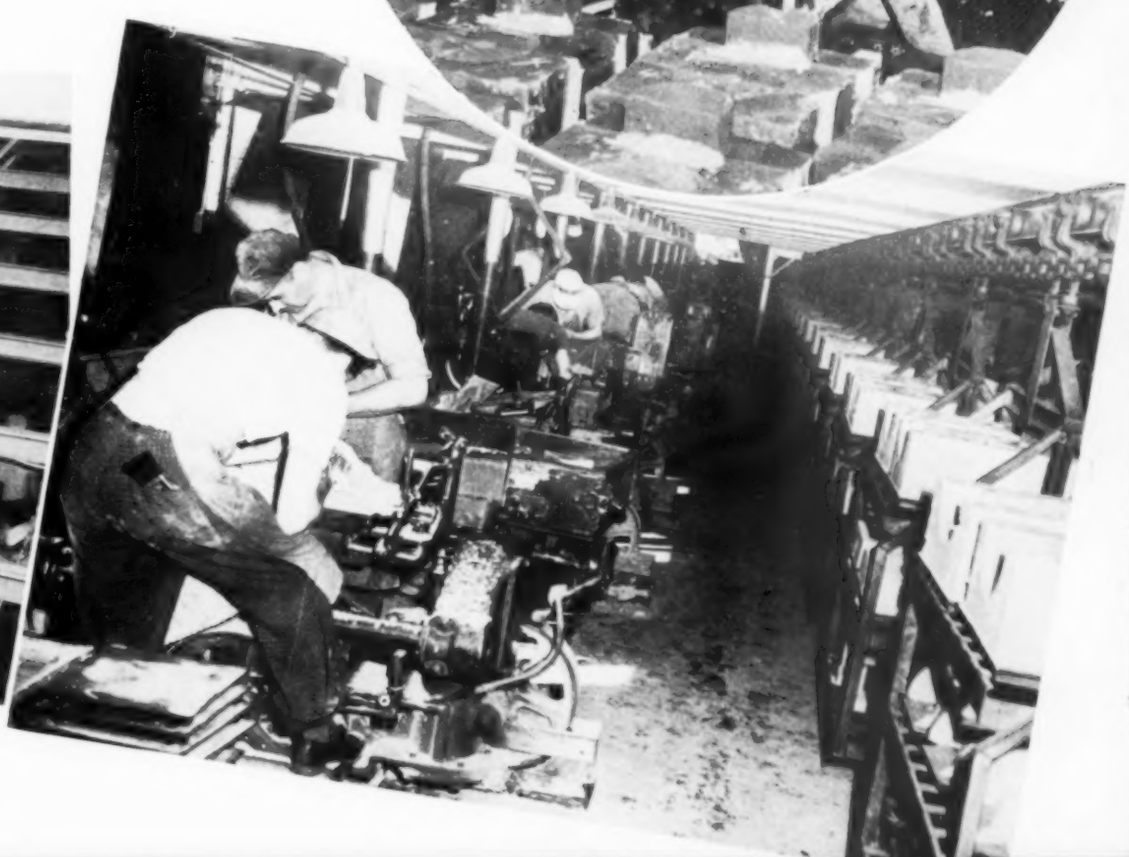
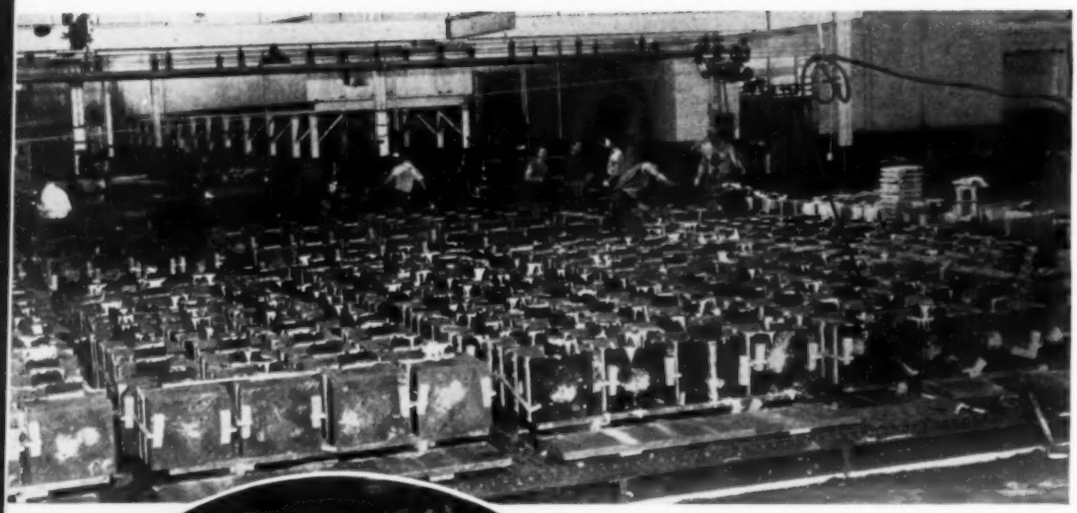


Fig. 1 (Upper left)—Dry sand cores form the inside and the outside of the casting. Fig. 2 (Lower left)—Thin sand ribs are reinforced with headless nails. Fig. 3 (Below)—Molding machines are supplied with sand from a trolley car on the balcony. Fig. 4 (Lower right)—Green cores are loaded on conveyor racks which carry them through the oven in 7 hours. Fig. 5 (Center right)—Note peculiar type bail and shank on the pouring ladle. Fig. 6 (Upper right)—Bull ladle is filled with molten metal from tilting pot furnace



One of the most interesting foundry processes is the construction of the mold for the exterior of the cylinder head which is made in halves. The thin sand sections between the cooling fins are reinforced with 1500 headless nails set by hand to prevent disintegration or breakage during handling, baking or pouring. Molds for the outside and cores, which form the interior of the cylinder head, are stacked on the racks of a constantly moving conveyor and baked for

Fig. 7 (Upper left)—Molds are assembled horizontally, then clamped and turned on edge for pouring. Fig. 8 (Center left) — Sand is broken away to remove casting. Fig. 9 (Lower left) —Special bench and vise fixtures facilitate chipping the castings. Fig. 10 (Above) —Airplane view of the new plant. Fig. 11 (Right)— Cleaned and inspected castings are heat treated. Fig. 12 (Far right)—Identification number is stamped on each casting

a period of 7 hours in a continuous type oven. When they emerge the two halves of the mold are assembled over the core with paste and aluminum clamps.

A bull ladle traveling on an overhead monorail carries the molten aluminum from the furnace in the melting room to the molds for pouring. When the metal has cooled to the proper degree in the mold, the castings are broken out of the sand, portions of which may be reclaimed for re-use. Excess metal is snagged off with band saws and flexible grinders prior to sandblasting which provides the final smooth finish.

Cylinder Heads Are Heat Treated

The cylinder heads are heat treated to remove stresses induced by cooling after the pouring operations, and to obtain stronger physical properties. To further equalize the grain structure of the metal they are also aged artificially by a heat treating process. In a final foundry operation the cylinder heads are pickled in a caustic solution bath which cleans the surface and reveals any defects.

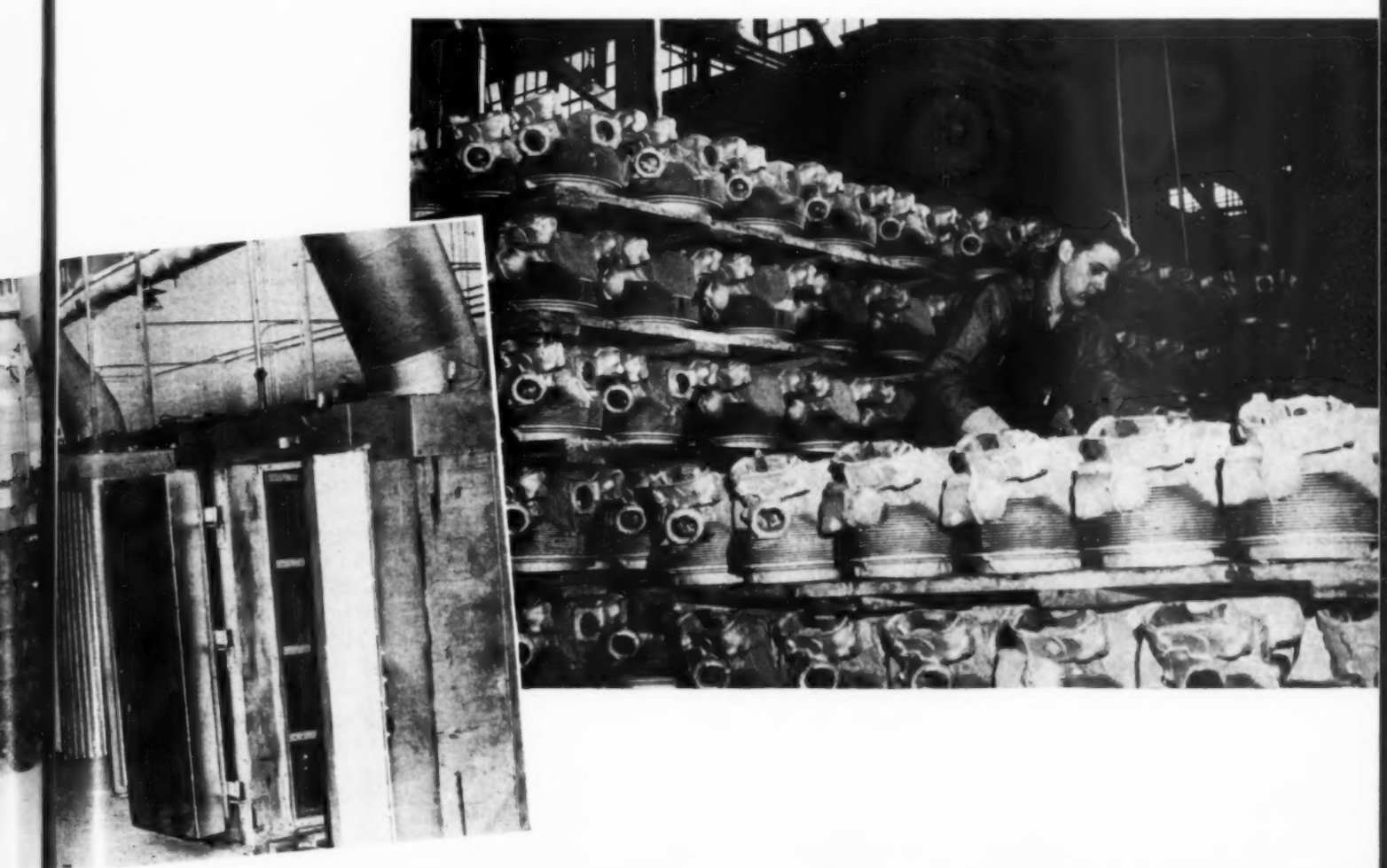
Depending on the type, from 9 to 18 cylinder heads are required for each Wright cyclone engine. Establishment of the auxiliary foundry at the Fairlawn plant prevents a bottle neck from developing in the manufacture of cylinders and will be an important factor in increasing production to meeting the requirements of the national defense program.

In view of this latest development it is interesting to recall that the first Wright foundry was established by the Wright-Martin Co., New Brunswick, N. J., predecessor of the Wright Aeronautical Corp., during the early days of the World war, 1914-1918. At that time the Wright-Martin Co., was manufacturing an airplane adaptation of the famous Hispano-Suiza aircraft engine under license from the parent company in France. The basic crankcase casting of intricate design was one of the first in which aluminum was used extensively. For the first engines, the crankcases were imported from Europe, but the majority required too many adjustments to be satisfactory. Existing aluminum foundries in the United States were reported as not enthusiastic about attempting to make these castings. The company built its own foundry at New Brunswick and when the Wright Aeronautical Corp. was formed and moved to Paterson in 1920, the foundry was re-established at the new site.

Plant Built in Record Time

On June 14 of this year the company opened its new Paterson plant No. 2, built in 57 working days and now is producing 3 times the number of aircraft engines produced a year ago. Another plant is under construction at Lockland, Ohio (near Cincinnati) with over 1,000,000 square feet of floor space and capable of producing an additional 1000 airplane engines per month for the national defense.

Magnesium, bronze (*Please turn to page* 92)



Questions and Answers

Small Plane Castings Show Many Pin Holes and Slag Holes

We are having diffculty in making small carpenter plane castings which are polished and plated. The castings contain pinholes and some slag holes. Castings are made from a 13 x 16-inch matchplate containing 10 pieces per plate. Molding sand is No. 0 Albany and the copes are 3 inches deep and the drags 4 inches. Iron is melted in a cupola lined to 30 inches run for 1 to 1½ hours without slagging, and tapped into 35-pound ladles which are held for a few minutes to permit the slag to rise and be skimmed off.

Without having a specimen for examination to confirm our opinion, it strikes us that the sand you are employing lacks sufficient permeability for the work at hand. Evidently the sand is not unduly tight or decided blow holes would be present. Therefore, our suggestion is to use a more open sand for the castings. Presumably, one of the reasons you are using a fine sand is to obtain as smooth a surface as possible. That still can be accomplished with the open sand by employing some of the fine sand just as a thin facing, and the open sand as the backing sand. Also it may be advisable to slag your cupola to eliminate that material in the ladle.

Bearing Running in Mud Must Be Protected Against It

One of our customers builds clay machinery, and the bushings we supply runs in mud. The steel shaft turns at a maximum of 38 revolutions per minute with a maximum pressure of 200 pounds per square inch, and is subject to not more than 100 degrees Fahr. Due to service conditions it is not possible to lubricate after installation, and it has been observed that copper particles from the bearing are ground out and get into the product being made causing considerable trouble. At one time we used a 65 per cent nickel—35 per cent copper alloy, later changing to 85 per cent copper—15 per cent nickel, but the trouble still continued.

Since nickel and copper form a solid solution, they do not have the attributes of a good bearing material which essentially is composed of hard bearing crystals imbedded in a softer matrix. The matrix may be lead as in the case of babbitt or an alloy of copper and tin in the case of a bronze. With no possibility of lubrication you have a problem on your hands which cannot be solved easily. One procedure might be to use a high-tin babbitt bearing or bushing packed in grease, employing a large pocket to contain the grease, and sealing it hermetically.

Another way would be to use the same alloy with a provision for grease lubrication under pressure which is a common method where dust, dirt and mud are present. Dust sometimes is worse than mud since it may be a more abrasive material. You probably are aware of the modern bearings comprised of a thin layer of a copper-high lead composition on a brass or steel backing. Such an alloy composed of 50 per cent copper and 50 per cent lead would be satisfactory with grease under pressure. The grease would be present for a long time, and as long as the grease were under sufficient pressure to prevent entrance of the mud or other foreign matter, lubrication undoubtedly would be sufficient.

Small Bracket Castings Show Dirt Caused by Loose Sand

We are sending two aluminum bracket castings which have given us a great deal of trouble due to dirt on the drag side. Pattern equipment consists of a gate of 10 patterns and are molded from a hard match. Metal used is No. 12 aluminum alloy ingot melted in an oil furnace, and transferred into an iron hand ladle for pouring. Cores are made from a mixture of 10 quarts of silica sand, 2½ quarts of molding sand and ¾-pints of core oil and water to suit. We have encountered this trouble on several jobs, but our greatest loss occcurred on the bracket castings.

Examination of the specimen castings indicate your difficulty is caused by loose molding sand which is carried along by the stream of molten metal, or perhaps it may lie in the mold cavity. It is difficult to say just where the sand comes from since by and large the edges and corners of the castings are sharp, indicating good workmanship. However, there are a few little places which indicate that the sand either has crumbled or been knocked off, and it does not take very much loose, dry sand to cause a defective casting. Our suggestion would be to see that the molds are blown out carefully before closing to eliminate any possibility of loose sand being in the cavity. Also, it might be a good idea to open up a mold after it has been cleaned carefully and closed. Examination of the cavity for loose sand would show the places where it has been knocked off, and suggest methods of eliminating trouble from that source.

It seems to us that you are using an extra ordinarily heavy branch gate from the runner, and we

believe that you can pour these comparatively light castings with a branch gate only half as thick or high. Cutting down the gate to a reasonable size would save a considerable amount of metal and we suggest that you try cutting down the gate since it will be well worthwhile in more ways than one. Examination of the holes formed by the core show a very rough condition, and it is hard to tell from this distance whether the cores were placed in the mold with a chewed up surface, or whether the roughness is due to lack of permeability in the core, causing the metal to boil to some extent. We are inclined to think that the rough surface on the interior is due to the lack of permeability of your cores. Our suggestion would be to eliminate the use of molding sand altogether, using just silica sand and core oil in the ratio of 1 part of oil to 40 parts of silica sand.

Manganese Bronze Propellor Is Gated Into the Hub

I shall appreciate your advice on the best manner to gate and feed a 3-ton manganese bronze propellor

Practically all manganese bronze propellors are gated at the bottom. The size of the wheel, crane equipment and other factors influence the foundryman on his decision to roll the pattern over in the drag, or bed it in. In many instances only one blade pattern is provided. Obviously the drag is not rolled over. The gate may enter the hub horizontally near the bottom, but a better method is to form the bottom of the hub in a dry sand core made up of two sections. When the two parts are pasted together the lower part contains a runner passage surrounding the center core print, while the upper half contains two or three vertical gate openings to conduct the metal from the runner to the inside of the mold.

A vertical sprue formed in dry sand cores, or between two blades in the body of the drag and cope, carries the metal to the runner at the bottom of the hub. The runner basin on top of the cope is provided with a plug in the top of the sprue. The plug is removed after the basin is filled with metal. Metal in the basin then is kept up with a stream from the ladle until the metal appears in the riser. By having the basin fairly high all the metal will drain out after the mold is filled. The object of the plug is to prevent any foreign material from entering the sprue.

A secondary object is to insure an even, steady flow of metal in the sprue. Manganese bronze develops a scum with the least agitation. The scum may stick any place on the surface of the mold and thus form a rough or actually defective area on the casting. Instead of a conventional riser the top of the hub is left open and carried up—in this instance—approximately 10 inches to form a feeding head, the full diameter of the hub. This metal of course is cut off later during the machining operation. Interesting articles on various methods for molding and casting propellors have appeared in THE FOUNDRY on many occasions. Method of placing gates and risers is described and illustrated in "Gates and Risers for Castings" published by the Penton Publishing Co.

Type of Steel Rail Melted Should Not Affect Final Product

Have you any data showing a difference in the tensile and transverse strength of two irons, one made from a mixture containing ordinary steel rails as part of the cupola charge, and the other containing a like amount of street car rails.

Offhand we do not recall any discussion on whether the class of steel in the cupola charge affected the chemical or physical properties of the resulting iron. Through one cause or another foundrymen use all kinds of steel, heavy and light, high and low carbon, street railway and standard steel rails, flashings and scrap from forge shops, punchings, shearings and general scrap from boiler shops, and even thin steel sheet scrap compressed into bales. Street railway rails and standard steel rails as used on the steam railroad systems of the country are practically alike. They are rolled from plain carbon steel with a carbon content of approximately 0.80 per cent. Possibly the difference in the size of the pieces of scrap may affect the operation of the cupola and require a slight adjustment in the technique. A slight change in the weight of the charges, amount of coke, pressure or volume of blast might supply the proper answer to your problem.

Small, Thin Aluminum Castings Exhibit Rough Surface

We are sending several thin castings made of No. 12 aluminum alloy with the addition of 1 per cent tin, and would like to know what is causing the roughness of surface. They were poured at approximately 1200 degrees Fahr. in medium-dry Windsor Lock sand; rammed firm but not hard.

We are of the opinion that the roughness is due probably to the manipulation of the sand rather than the sand itself. The sand used is extremely fine, and theoretically should give a smooth surface on the casting when handled properly. However, due to its fineness, it must not be rammed too hard.

We note that you are using your sand on the dry side, and believe that with such a condition, the molder has a tendency to ram harder than when the sand is more moist. That is due to the fact that dry sand does not hold together as well as moist sand. Therefore we suggest that the sand be rammed just sufficiently that it will hold without dropping or washing. In many respects Windsor Lock sand is similar to French sand in that it may be rammed extremely hard—provided that it is dried thoroughly.

You state that you are pouring the castings at approximately 1200 degrees Fahr., and we wonder if that is an error. Ordinarily the melting point of No. 12 alloy is around 1200 degrees, and it hardly would be fluid enough to run heavy castings, let alone thin ones. If you are employing a pyrometer, we suggest you have it checked for accuracy. With the small, thin castings you are making, we should judge that the pouring temperature should be at least 1400 degrees, and perhaps close to 1500 degrees Fahr.

Cupola Dimensions Not Constant

We shall appreciate information on the proper dimensions of a 60-inch inside diameter cupola equipped with a wind box around the outside. What are the shape, size and position of the tuyeres, height of charging door, etc.

Cupolas are built to meet ordinary and special conditions and as a result dimensions of certain parts may vary to a considerable extent. For example where the stream runs constantly, the tuyeres are much closer to the bottom than where a large quantity of metal accumulates in the well before it is tapped. Existing condition of a building may dictate the height of the charging floor and door. The following approximate dimensions may be adapted to meet special requirements. Inside diameter 60 inches, shell diameter 78 inches, continuous tuyere opening 4 inches high, or eight tuyeres 7 x 12 inches, tuyeres 21¼ inches above bottom plate, slag hole 15 inches above sand bottom, charging door sill flush with charging floor 16 to 22 feet above top tuyeres.

Approximate charge for a 60-inch cupola is 2250 pounds of iron and the cupola may hold from 5 to 10 charges before melting commences. The brick lining is 9 inches thick, one course laid with the ends pointing to the center, or two bricks set upright with the narrow faces on radial lines.

No Blacking on Top Core Surface

In one shop we noticed that no blacking is applied to the upper or cope faces of cores. In an extended experience of over 30 years of general coremaking practice in nearly every section of the country, this is the first shop we have seen where blacking is omitted from the upper core surface. The alleged reason for this practice is that when the iron strikes the bottom of the core and starts to flow upward, the gas generated by the heat travels upward through the core. It is claimed that if the top of the core is covered with blacking, the gas cannot pass through and the result is blow holes and scabs on the surface of the casting. This line of reasoning does not appeal to us and does not agree with our experience. We shall appreciate your opinion.

This is one of the many border line cases, where a flat general order is issued to do thus and so, instead of trying to deal with occasional small lapses. Under certain conditions in thin castings the blacking coat on the top side may be one of the contributory factors in producing a defective casting, but this is not because the blacking prevents the gas from flowing through the top surface of the core. If it was the cause, every iron casting with a core blacked on the upper side would be defective. Your experience and that of any practical coremaker or molder covers thousands of instances where the cores are blacked all over and the castings have been perfect.

The practice of leaving bare or unblacked areas on upper core faces originated in the automobile foundries where a piece of paper is laid over the flat area on the crankcase core, before the core is dipped in the blacking tank. This is done for two reasons. The first is to promote the flow of metal. Every foundryman knows that metal flows more freely over bare sand than it does over blacking or over sand containing coal dust or other combustible material. This feature is illustrated in green sand foundry practice where the amount of coal dust in the facing sand is reduced gradually to correspond with the thickness of the casting and omitted altogether from the facing on very thin castings. Molten iron is covered with a thin film. This film increases in thickness to correspond with decrease in temperature. Extreme cases may be noted in chilled castings where unless the metal is hot and poured rapidly the film retards the flow of metal sufficiently to form waves or ridges on the face of the casting.

Facing sand or blacking produces the same effect to a lesser extent. Small amounts of gas will pass through thin liquid metal, but will be trapped and held by metal on which the film is too thick. Even under the best regulated conditions this condition occasionally appears. Briefly, the omission of blacking on the upper core face helps to prevent the formation of cold shuts or the trapping of small gas jets. If the core shows a tendency to blow, scab or cut, it is not sufficiently permeable or vented properly and will develop these characteristics irrespective of whether it is blacked or not blacked.

Wrinkles Appear on Chilled Wheels

Tread and flange on our 12 and 16-inch chilled car wheels show dirt and wrinkles. The chill is greased and dusted with facing. The ladles are skimmed and we have tried pouring the metal from two ladles simultaneously with a view of filling the mold rapidly.

Rapid pouring is essential to prevent the formation of wrinkles on the chill face, but in this case possibly another factor has been overlooked. The metal must be hot. No system of gates or pouring will prevent the formation of wrinkles with dull iron. The dirt or slush may be due to any one of a number of variables. In the majority of instances it may be traced to dirty or rusty chills, or to a coating material which burns or flakes away from the chill. You might check this feature by pouring a wheel in an open mold and note the action of the metal as it rises. Many foundry supply houses handle special chill coating materials.

Small Hollow Rolls Show Gas Holes

Recently we found blow holes in small hollow cast iron rolls weighing from 150 to 500 pounds. The castings are molded and poured in a horizontal position. The cupola charge is made up of 70 per cent scrap, 20 per cent pig iron and 10 per cent steel rails. Analysis of the pig iron shows silicon, 2.85 per cent; sulphur, 0.02 per cent; phosphorus, 0.45 per cent, and manganese, 0.85 per cent. Inside diameter of the cupola is 36 inches. The bed coke extends 24 inches above the tuyeres and the first iron appears in about 10 minutes. We pour two rolls from a 1000-pound ladle. After the first roll is poured the iron appears to lose life.

Blow holes may result from either mold or iron condition, or in some instances from a combination of both. Although not an infallible indicator, the appearance of the holes shows which factor is responsible. If the holes are scattered all through the casting and present a more or less colored surface, it is safe to assume that the melting practice is at fault. If the surface of the holes is clean and uncolored and if they appear only in the upper or cope section it is fairly safe to assume that they result from unsatisfactory mold or core conditions.

From the fact that the cupola bed is only 24 inches above the tuyeres and that the iron loses life quickly, we are inclined to the opinion that the cupola practice is at fault. The bed is too low. The iron is oxidized and is not melted at a sufficiently high temperature. Raise the bed to 36 inches. Check the blower to deliver 2100 cubic feet per minute at a pressure of 8 to 10 ounces. Have the bed bright and red before adding the last 6 inches of coke and allow the entire charge to soak in the cupola for 30 to 40 minutes before putting on the blast. Blow holes which appear only in the upper part of the casting probably are caused by a core that is too hard or is not sufficiently dried.

(*Concluded on page* 54)

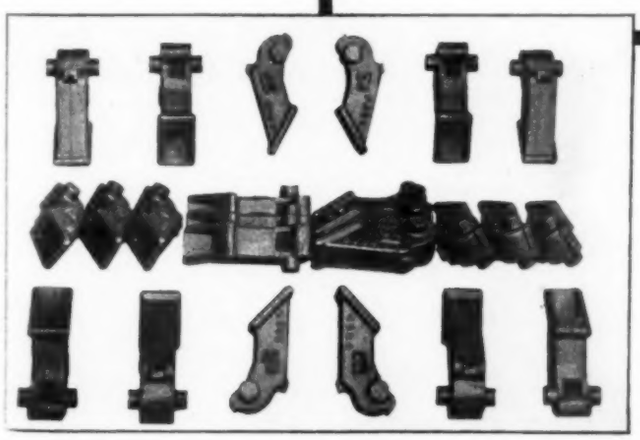
Gives "good measure" that gets foundrymen more GOOD BUSINESS...

...CAST NICKEL STEEL

The five-ton hydraulic cylinder, illustrated below, was cast in 2.35% Nickel—0.25% molybdenum—0.70% manganese steel by the DOMINION FOUNDRIES & STEEL, LTD., HAMILTON, ONT. Nickel steels stoutly resist wear, retain impact strength at elevated and sub-zero temperatures. Even at high hardness, Nickel steels machine readily.

20-ton counterweight sheave cast by COLUMBIA STEEL CO., PITTSBURG, CALIF., in 0.26% carbon steel strengthened and toughened by adding 2.60% Nickel. Nickel steels retain their strength through wide ranges of temperature and their wear-resistance through many long years.

"GOOD MEASURE"... the extra service that high strength, long-wearing Nickel steel castings give... helps progressive foundrymen hold present customers and attract new ones. Nickel alloy steel castings sell readily, at slightly higher prices than ordinary carbon steel castings, because their increased properties bring welcome fabricating and service economies to users.



Small parts, too, offer opportunities to sell more Nickel steel castings. Any equipment subject to wear and stress needs the added protection provided by high strength Nickel steels. These mechanical jack parts were produced in Nickel-chromium steel, similar in composition to SAE 3120, by the ELECTRIC STEEL CASTINGS CO., INDIANAPOLIS. The stressed trunnion arm castings develop a tensile strength of 125,000 lbs./sq. in.

Your questions about casting or machining Nickel steels will be answered promptly upon request to:

THE INTERNATIONAL NICKEL COMPANY, INC. **67 WALL STREET NEW YORK, N. Y.**

(*Concluded from page* 52)

The core should be hollow or filled with coke and ample vent holes should be provided for the escape of gas.

Aluminum May Not Be Responsible

When we use cast iron scrap containing aluminum the castings are full of holes. In many instances the metal backs out of the sprues. Our investigation seems to indicate that the aluminum content is the cause of the trouble. We shall appreciate reference to any published information on the use of aluminum in cast iron in quantity above 1 or 2 per cent.

Some years ago a prominent foundry ran experiments with various high percentages of aluminum in cast iron, up to 20 per cent. All the graphite and most of the aluminum came to the top. The castings were less than worthless. The metal was a mushy mess hardly liquid enough to run. Castings were filled with blow holes. A number of references to aluminum in cast iron may be found on pages 194 and 195 in "*Gray Cast Iron*," by J. W. Bolton, published by the Penton Publishing Co., Cleveland. You do not state the approximate amount of aluminum in the cast iron scrap you are using. Although aluminum oxidizes readily, we venture the opinion that the aluminum is not the cause of the trouble. Faulty cupola practice may be responsible. We suggest that you analyze the sweat beads. Addition of soda ash to the cupola charge, or in the ladle will reduce the alumina.

To Make Molds for Cast Iron Dogs

We want to make some cast iron statuary, frogs, dogs, elephants, etc., but we are not familiar with the method of preparing the patterns or the molds for these — presumably — complicated castings. Can you refer us to any literature on this subject?

Production of statuary is a highly specialized branch of the foundry industry and requires the services of specially skilled men in the preparation of patterns and molds. Comprehensive articles on various phases of the subject appeared in the following issues of THE FOUNDRY: February, 1911; June and July 1917; July 1, 1924; Aug. 15, 1926; April 1, 1927; June 1, 1927; Oct. 15, 1928; Nov. 1, 1928; Feb. 1, 1930; September, October, and November, 1934 and February and March, 1935. These methods discuss bronze statuary, but the basic principles and many details apply to all metals.

Small individual castings are made in sand or plaster molds. Where large numbers of duplicate castings are required, they are made by the so-called slush mold process. A bronze mold in two or more parts, hinged and actuated by a lever is mounted at a convenient height on swivels. A white metal composition is poured into the mold and allowed to stand until a shell has frozen next to the mold. The mold is inverted and the remainder of the metal is spilled out. The mold then is opened and the casting removed. In this manner no core is required and the amount of metal in the casting is held to a minimum. Initial expense of making the mold is rather high, but when spread over a large output is practically negligible. The method is not applicable to gray iron and merely is mentioned here as a possible alternative to the program you have in mind.

Large figures may be cast as units or in several sections. The sections afterward are joined with rivets or with bolts through internal flanges. The sectional method greatly simplifies the molding problem. Two methods are employed in making the molds, the so-called *cire perdu* or lost wax method, and the piece mold method. One mold is plaster, while the other is sand. In the first a wax replica of the object is enclosed between an inner and an outer plaster wall. The entire mold is placed in an oven and the wax is melted out. The resulting cavity then is filled with metal.

In the second method the mold is made in sand in a two part flask. After the pattern is removed an intricately built up arbor is placed in the cavity and the mold is rammed full of sand. One half of the mold is removed and a thickness of sand, corresponding to the thickness of metal in the required casting, is removed from the exposed half of the core. The half mold is replaced and the entire assembly rolled over. The second half of the mold then is removed and the other half of the core is shaved. The mold then is reassembled, dried in the oven and later filled with metal. This is just a brief outline. Usually a considerable number of drawbacks are required over the face of the mold and these introduce complications only to be surmounted by a highly skilled molder familiar with this class of work.

In the old cast iron dog days, a hollow metal pattern split approximately through the center was employed. With the exception of one or two drawbacks, the molding method was the same as that employed in molding many soil pipe specials. The pattern formed both mold and core. The cope was rammed first and rolled over. The core was rammed followed by the drag. The drag was lifted off and one half of the pattern was removed. The drag was replaced and the entire assembly rolled over. The cope was removed and the upper part of the pattern lifted away from the core. The cope then was replaced.

The foregoing is a brief synopsis of the subject. The answer to your specific question on how to remove the pattern from the sand, is that you will require one or more drawbacks, bodies of sand, to be removed separately from the pattern in the sections where a straight lift cannot be secured for cope or drag. Obviously the preliminary designing and construction of the pattern should be entrusted only to a man familiar with the work.

Measure Air Supply For the Cupola

We operate a 54-inch diameter cupola with a rated capacity of 10 tons per hour. Under particularly favorable conditions we have melted 12 tons per hour. We are not satisfied with the coke to iron ratio. We shall appreciate your opinion on the advisability of putting a control device on the cupola to measure and adjust the air supply.

Approximately 10 tons per hour is the rated capacity of a 54-inch cupola. So many factors are involved in the operation of a cupola that it is impossible to set an arbitrary limit. For example, it is obvious that a cupola will melt better and faster with a high carbon coke than with a coke of inferior quality. Iron broken into small pieces will melt faster than large heavy chunks. Coke size will vary the speed of melting. Wide variation in temperature and humidity of the air affect the melting speed.

Character and volume of slagging material may maintain or reduce melting speed. Maximum melting speed is attained where the volume of air is sufficient to consume the coke in a minimum period of time. You probably are familiar with the theory of combustion, the union of oxygen and carbon.

Theoretically 1 pound of coke will melt over 10 pounds of iron. On account of the many variables involved, this ratio between charges rarely is attained, particularly where exceptionally hot iron is required. Since the oxygen content of air varies according to the temperature and moisture content, some form of control device is essential to insure uniform operation. In recent years special blowers and control devices for regulating the volume of air entering the cupola have been placed on the market by several manufacturers.

SPEED UP YOUR PRODUCTION OF SOUND, SMOOTH, CLEAN CASTINGS WITH

This Versatile Low-cost Bonding Material Acts on Different Principle —Cuts Time of Every Step—Helps Hold Rejects to Minimum

Today the demand is for speed. Orders must be filled on time—ahead of time, if possible. In this, Truline Binder can help, for it acts on a different principle that shortens working time at every step from sand to finished metal shape.

Truline Binder is a solid, in non-caking powder form. It is easy to handle and mix, developing an easy-flowing core sand of low green strength that rams quickly, permitting more cores per hour.

Dries Fast by Condensation

Truline Binder does not dry by oxidation—needs no air to develop bond. Truline dries by volatilization and condensation. Thus, baking times are sharply cut. The resultant cores have good dry strength, and stand up to the action of hot metal with less cutting or washing.

Truline reduces cleaning-room time, because it burns out completely above 650°. The cores collapse and disintegrate, permitting easy removal of core sand. The result is fast knockout and a minimum of cleaning. Further, since the casting may shrink freely, rejects due to shrinkage-cracks and like defects are held to a minimum.

Fast and Economical

Truline Binder will help you attain more cores and castings per shift, and do away with the congestion in the cleaning room. You will get this definite increase in production of sound, clean castings *economically*, too; for Truline is low in cost, can be used with reclaimed sand in most cores, and makes superior core washes and mold-facings as well.

We should like to show you how to speed your casting operations and save money with Truline. Write for a trial amount or, better, ask us to demonstrate this new-type bonding agent in your own plant.

MEN of INDUSTRY

CHARLES HOEHN, for many years president, Enterprise Foundry Co., San Francisco, recently was made chairman of the board of directors, and CAPT. C. S. MCDOWELL, U. S. N. retired, was appointed president and general manager. Capt. McDowell formerly was shipbuilding consultant at the Consolidated Steel Co., Los Angeles, and previous

Charles Hoehn

to that was manager of the Pearl Harbor navy yard, engineer officer at Mare Island, and supervising engineer of design of the 200-inch telescope and director of construction of the Palomar Mountain observatory.

♦

HUBER O. CROFT, professor of mechanical engineering and head of the department, University of Iowa, Iowa City, Iowa, recently was elected a manager of the American Society of Mechanical Engineers.

♦

MIGUEL SIEGEL, Institute de Pesquisas Technologicas do Estado de Sao Paulo, Brazil, (State Institute of Technological Research) spent several months recently in the eastern and middle west states studying foundry and general conditions and purchasing supplies and equipment for a modern experimental foundry now nearing completion by the government at the Sao Paulo government institution.

♦

C. P. ANDERSON, formerly foundry superintendent, Madsen Iron Works, Huntington Park, Calif., recently has been made foundry superintendent of the Snow Mfg. Co., Los Angeles.

♦

JOHN L. SCHMELLER, for many years connected with the sales department, has been made vice president in charge of sales, National Bronze & Aluminum Foundry Co., Cleveland.

♦

PAUL B. EATON, consulting engineer, and professor and head of the mechanical engineering department, Lafayette college, Easton, Pa., recently was elected a manager of the American Society of Mechanical Engineers.

♦

J. T. SUTLIFF recently has been placed in charge of the Chicago office of the Roots-Connersville Blower Corp., Connersville, Ind., succeeding the late William Townsend. E. A. COONS, graduate engineer, has been named assistant to Mr. Sutliff.

♦

W. RICHISON SCHOFIELD, formerly chief engineer, Leeds & Northrup Co., Philadelphia, recently was appointed director of engineering of that company. JOHN W. HARSCH, assistant chief engineer, was made chief engineer and JOHN F. QUEREAU has been made assistant chief engineer.

♦

GEORGE H. JOHNSON has been elected president of the Gisholt Machine Co., Madison, Wis., succeeding his father, HOBART S. JOHNSON, who is now chairman of the board. The new president represents the third consecutive generation of the Johnson family to hold that position, the company having been founded by his grandfather, John A. Johnson, in 1889. H. S. JOHNSON JR. has been elected vice president, A. B. MOREY re-elected treasurer and G. E. GERNON re-elected secretary.

♦

C. C. HERMANN has been appointed chief engineer, the Claude B. Schneible Co., Chicago. Mr. Hermann has been in charge of the company's Philadelphia office as

C. C. Hermann

sales engineer since 1937. Previous to that he was connected with the engineering department of Deere & Co., Moline, Ill., for a number of years, and later was plant engineer, John Deere Tractor Co., Waterloo, Iowa. Mr. Hermann is a licensed mechanical engineer, a member of the A. F. A. and other engineering societies. He has been a frequent contributor to THE FOUNDRY.

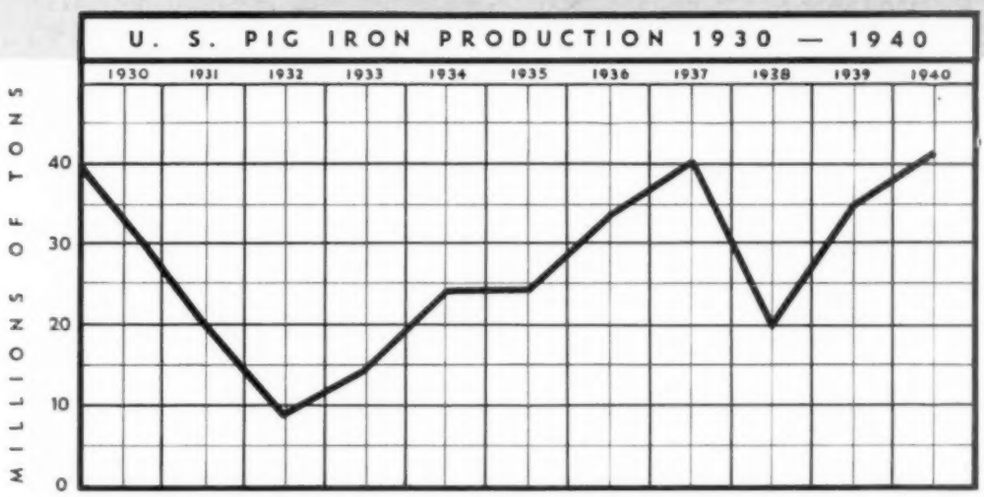
♦

HAROLD R. KING, recently was appointed metallurgist, Metal & Alloy Specialties Co., Buffalo, and is installing a complete nonferrous laboratory equipped for physical and chemical testing, and metallographic examination. Mr. King received his formal education at Howe school, Howe, Ind., and the Armour Institute of Technology, Chicago. After leaving school he specialized in non-

(*Concluded on page* 58)

CONDITIONS CHANGE

In the Iron Trade



...but under all Conditions Woodward Iron Company Consistently Maintains

UNIFORMITY OF PRODUCT

UNIFORMITY OF SERVICE

UNIFORMITY OF POLICY

Regardless of the trend of the Times

WOODWARD IRON COMPANY

America's Largest Completely Integrated and Entirely Independent Merchant Iron Producer

INDEPENDENT SINCE 1883

(*Concluded from page 56*)

ferrous metallurgy and has served 7 years as chemist and metallurgist in the bronze bearing industry in Illinois and Ohio, and 4 years as research metallurgist in bronze valve manufacture in Connecticut.

• • •

ROBERT C. STANLEY, chairman of the board and president, International Nickel Co. of Canada, Ltd., recently was named first recipient of the Charles F. Rand gold medal by the American Institute of Mining and Metallurgical Engineers. The medal will be presented at the institute's annual meeting in February, 1941.

• • •

S. C. DUTOT has been made division manager in charge of sales in Birmingham, Pittsburgh, Cleveland and Detroit, for the Electro Metallurgical Sales Corp., with headquarters in Pittsburgh. Offices also will be maintained in Cleveland with E. E. WRIGHT as district manager and at Birmingham with F. H. HANSON handling sales and service in the Southeastern states. W. E. REMMERS has been appointed division manager for the Middlewest with headquarters at Chicago, and R. E. BROWN has been appointed division manager in charge of sales and service on the Pacific coast with offices in San Francisco.

• • •

B. G. EMMETT, foundry superintendent, Los Angeles Steel Casting Co., Los Angeles, recently was elected vice president of the Southern California chapter of the American Foundrymen's association, succeeding GLEN W. MERREFIELD, who has moved to East Chicago, Ind. The chapter board of directors has elected W. D. BAILEY JR., Pacific Metals Co., Los Angeles, to succeed Mr. Emmett as a member of the board of directors.

• • •

RENATO WOOD, general manager, Cia. Brasileina de Usinas Metallurgicas, Rio Janeiro, Brazil, who has spent the greater part of the year in the United States, probably will sail for home about the end of November. Mr. Wood's firm is an extensive importer and exporter of steel and other products and in addition operates charcoal blast furnaces at Minas Geraes and open hearth steel furnaces and rolling mills at Neves. The firm also operates foundry departments producing gray iron and malleable castings.

• • •

C. MILTON EKBERG, sales engineering department, Norton Co., Worcester, Mass., has been appointed field engineer in the Chicago district and WILLIAM A. RUSSELL, has been appointed field engineer for the Pittsburgh territory. ALDEN P. JOHNSON, has been transferred to South Bend, Ind. as a salesman to assist J. B. ECKSTEDT. J. L. DEVOU, who has been engaged in field engineering work in the Chicago and Cleveland districts, has been appointed salesman with headquarters in Toledo, O. to assist R. H. CANNON.

Down Draft Removes Grinding Dust

Monarch Machine Tool Co., Sidney, O., recently has installed a down draft ventilating system where castings are ground, sanded and spray painted, before they are machined. The installation includes 14 working stations, three for lathe beds and other large castings and 11 for small castings. A grating on top of each unit supports the casting and permits removal of dust and small particles. Gratings for the large castings are flush with the floor, while the gratings for the smaller castings are located at 16, 20 and 32-inch levels above the floor. Units in the grinding section include a two-wheel snagging grinder, a surface grinder for castings up to 4 feet square and four grinding bucks, the largest 4 feet in diameter, provided with sheet metal guards. Total amount of air removed is 50,000 cubic feet per minute at an average surface velocity of 200 feet per minute. The five blowers in the installation were supplied by the American Air Filter Co. Inc., Louisville, Ky.

Foundrymen who like to make their own special compounds for various purposes may be interested in trying their hands in concocting an abrasive hand soap which is claimed to remove readily grease, dirt, grime and paint without undue irritation of the skin. The soap is composed of 100 parts soap chips, 200 parts water, 150 parts pumice or fine sand, 10 parts sodium silicate, 10 parts glycerine, and 5 parts perfume.

Views from opposite ends of the grinding room where machine tool castings are placed on gratings connected to a down draft ventilating system

THREE JOBS...ONE IRON

Versatility in cast iron — especially when economically obtained . . . is a valuable asset for both the foundry and the user.

Consider, for example, the experience of a manufacturer of Diesel engines — and the economies effected by using one base iron to meet three distinct sets of requirements. One set calls for ability to resist wear and hold pressure at operating temperatures, the second for toughness and pressure resistance at the same temperatures, and the third for the wear resistance and toughness essential for timing gears and similar parts. Good machinability is, of course, a prime requisite in all three cases.

All these varied requirements are being met by using the same Chromium-Molybdenum (0.60—0.70% Mo.) base iron; only slight changes in the analysis are necessary. The practical and economical advantages to the foundry are obvious. And the user benefits by getting reliable, machinable parts at reasonable cost.

You will find our book, "Molybdenum in Cast Iron", both interesting and helpful. A copy will be sent free on request.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

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500 Fifth Avenue · New York City

MOLY

DETROIT AMONG FOUNDRIES

By A. H. ALLEN
Detroit Editor, The Foundry

AS THE government defense program swings into full stride, with particular emphasis on the aircraft phase, it becomes increasingly apparent that pressure on suppliers of aluminum and magnesium castings soon will be enormous. Packard, about to launch the manufacture of 9000 Rolls-Royce aircraft engines for the United States and British governments, and with a plant already going up for the purpose, is endeavoring to line up sources of supply for aluminum alloy cylinder blocks, crankcases, blower and supercharger housings and similar castings. While these castings will not be needed in any quantity for nearly 10 months, once manufacturing gets under way a steady flow of these large and expensive castings will be essential.

Ford Builds New Plant

A new Ford plant for Pratt & Whitney engine manufacture likewise now is under way and is scheduled for completion early in January and operation possibly in March. Here again a large number of aluminum and magnesium castings will be vital. Present sources for such castings are hard pressed to keep up with demand from domestic aircraft engine manufacturers and will not be in good position to add Ford or Packard business. Furthermore, even should castings suppliers expand sufficiently to accommodate this new business, there is question whether supplies of aluminum and magnesium metal would be sufficient.

Already it is understood, government priorities on aluminum may be established shortly, and manufacturers of aluminum consumer goods may find their supplies of metal appropriated by the government for defense program needs.

As far as magnesium is concerned, it is doubtful whether priorities would do much good, since nearly all that metal now is going into aircraft manufacture. Dow Chemical Co., being practically the sole source of magnesium, is pushing its facilities to the limit to meet the demand and is expanding operations in Texas for additional supplies.

There is a report in Detroit that Ford soon may undertake production of magnesium in its steel plant by electric furnace reduction of magnesium ores. Dow is said to have been making experimental studies of a similar electric reduction process using magnesium ores, but has not introduced the process commercially. Should Ford proceed with the reported process, it would no doubt solve the problem of where to obtain magnesium for the P&W engines. Another unconfirmed report is that Ford will set up a magnesium casting department in the so-called electric furnace building at the Rouge plant. With facilities for both reduction of magnesium ores and production of castings, Ford would be in an excellent position on those requirements.

Another source for magnesium castings, the Bohn plant in Adrian, Mich., Magnesium Fabricators Inc., has doubled its capacity at least twice in the past year and more recently planned to expand again to permit production of 13,500 pounds of castings a day. Suddenly, however, that program was called off after complete quotations had been taken on equipment and buildings. Explanation was that more detailed surveys were needed of financing arrangements and the available labor supply in Adrian, Mich. Equipment interests in Detroit, speculating on the hold-up, wondered whether the bottleneck in supply of magnesium metal may not have been a more potent reason for the suspension.

May Open Iron Foundry

New gray iron foundry may be opened shortly in Howell, Mich., under direction of Edward A. Kreller, formerly superintendent for Detroit Gray Iron Foundry Co. Detroit, large supplier of large alloy iron castings for automobile dies. Mr. Kreller contemplates re-equipping the former Erb-Joyce Foundry Co. in Howell and undertaking production of gray iron castings up to 5 or 6 tons in size. Full details are not as yet available.

The New York automobile show, official sound-off for the 1941 model season, has come and gone and all the new creations of motordom have been unveiled for the public's curried fancy. A quick recapitulation of advances shown by the various makers is as follows:

General Motors lines, including Chevrolet, Pontiac, Olds, Buick, and Cadillac, are featuring three general body types. The Chevrolet body, wider and roomier and patterned after a modified torpedo design, is used also by Pontiac and Olds on the least expensive lines, available with either 6 or 8-cylinder engines. A new "fastback" type of body, without trunk but providing the same interior dimensions as last-year's well received torpedo bodies and with concealed running boards, is offered on Cadillac, Buick, Olds and Pontiac. The torpedo bodies, continued substantially unchanged in overall size and dimensions, also are available on these four makes. Fender decorations, or speed lines as they are called, are featured by all the General Motors models.

Install Fluid Drives

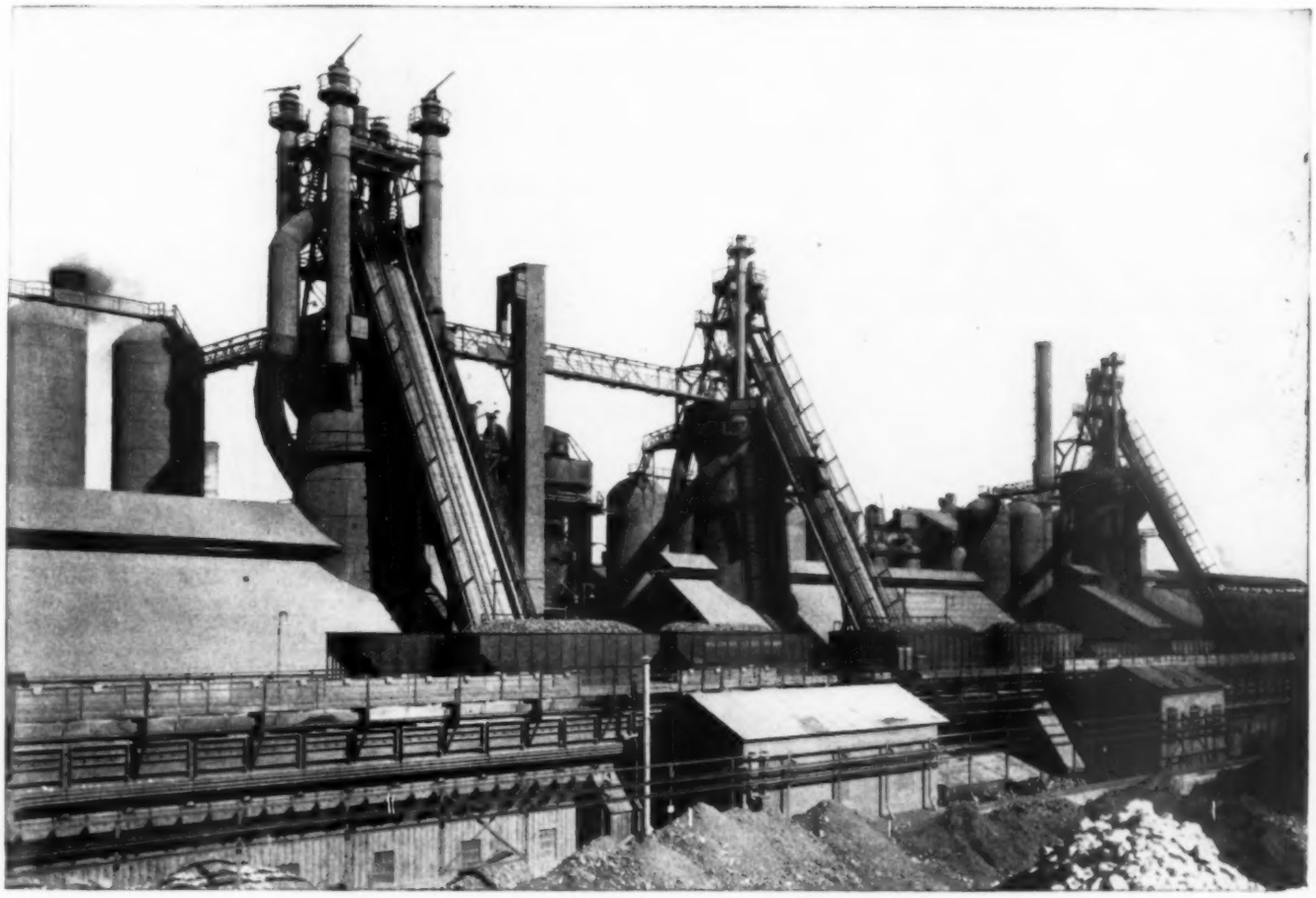
Chrysler bodies likewise bear a family resemblance and are used interchangeably on certain models of the Plymouth-Dodge-De Soto-Chrysler series. Chrysler sales efforts are being concentrated heavily on the fluid drive this year, offered on Dodge, De Soto and Chrysler as optional equipment. De Soto and Chrysler combine with the fluid drive a new transmission, with four forward speeds, and with only two shift positions manually controlled. This is calculated to compete with the Olds hydra-matic drive, a fully automatic transmission which later this year will be available on Cadillac, according to reports.

Packard has stressed exterior finishes and appointements, introducing a number of new two-tone color combinations. Complete air conditioning, including refrigeration equipment, is available on the larger Packard models, as is a new system for hydraulic regulation of car windows.

New bodies have been developed for the Ford lines; springing has been improved though not radically

(*Concluded on page 62*)

ALWAYS ON CALL



Blast furnace unit at Wisconsin Steel Works, Chicago

● Wisconsin Steel Company is always ready to handle your pig iron orders promptly. The orders may be large or small; they may be urgent or routine. But of this you may be sure: you will like the efficient way Wisconsin Steel fills your orders.

If you are a regular customer, you have come to appreciate the uniform, dependable quality of Wisconsin Pig Iron. If you have never used our product, we urge you to get acquainted with it. Manufacturers of quality castings in every line of business are finding that it meets their needs exactly.

We suggest that you try Wisconsin Pig Iron soon. It is "Better Controlled from Mine to Mold." The skill and experience of practical foundrymen and trained metallurgists stand behind every pig. The result is a product that is uniform and true, through and through. Inquiries will receive prompt attention.

WISCONSIN STEEL COMPANY

General Offices:

180 North Michigan Avenue Chicago, Illinois

Affiliate of International Harvester Company

WISCONSIN PIG IRON

"BETTER CONTROLLED FROM MINE TO MOLD"

(*Concluded from page 60*)

changed. The Ford 6 engine will not appear until January. Lincoln is making much over its Continental series of models, a low-hung rakish appearing design originally said to have been conceived by Edsel Ford. Ford has introduced a new 4-cylinder engine for truck installations. The engine is practically a duplicate of the tractor engine, developing 30 horsepower at 2800 r.p.m.

Willys has christened its 1941 creation the Americar, and has launched an effective campaign of promotion, originally conceived by the late Theodore F. Macmanus.

Nash has launched its new Ambassador 600 model with 6-cylinder engine said to give gasoline economy of 25-30 miles to the gallon and featuring a "unitized" system of frame and chassis construction, independent springing on all four wheels and other refinements.

Studebaker has restyled its three lines of cars and is stressing two-tone finishes on both exteriors and interiors.

Hudson also accentuates styling ideas, using the term "symphonic styling" to connote harmonizing treatment of both interiors and exteriors.

Plans for 1941 models of Graham and Hupmobile are indefinite at this stage, both of these producers struggling manfully to keep their heads above water and recapture some of their lost retail market.

So, with prices up on an average of 2 to 5 per cent, except for Nash which confounded the industry by lowering prices fractionally, the industry is set to go on a model year which is hoped will better by 10-25 per cent the showing for 1940 models.

Since 1940 will be the third successive year of increase over previous years, some statisticians are inclined to the view that the "cycle of three" will prevail in 1941 and a new base established for succeeding increases. This rule has been followed for 15 years in the industry, but unsettling international conditions, plus the huge expenditures being made for defense equipment manufacture may knock it askew in 1941—at least the motor industry is hoping they will.

From the standpoint of castings, no sparkling innovations have been effected, but at the same time castings, both ferrous and nonferrous, have taken no back seat in engineers' preferences. Auto foundries currently are adhering to the high rate of assembly lines, and in fact are anticipating maintenance of an accelerated pace of assemblies in the next month or two.

Increase Capacity Of Steel Plant

Bettendorf Co., Bettendorf, Ia., let contracts in August for an expansion plant program involving $500,000, and designed to increase and accelerate production in a steel foundry recognized for many years as one of the largest in the country. Program includes installment of assembly line equipment and methods in the core rooms, molding departments and shakeout stations. New furnaces will be built, conveyor systems installed, chemical and metallurgical laboratories erected. Many other improvements will make this the most comprehensive schedule ever undertaken by the company.

Present core ovens will be replaced by a battery of 10 fully automatic units, operated in pairs. Dehydrated, flame free air is drawn from the heating plant and forced through the furnaces to change the air every 7½ seconds. Continuous conveyors will carry the cores from the ovens to the molding floors. The foundry proper will be revamped on assembly line principles where the latest type automatic molding machines are fed from overhead sand hoppers. It is claimed the sand mills represent a new method of positive sand control. Aerators and sand conditioners which remove tramp material and hold fines to 8 per cent assure a correct sand mixture. A discharge conveyor system will carry the molds from the individual production units to the pouring floor.

Open hearth furnaces will be reworked to incorporate latest developments in practice. All furnaces will be equipped with automatic pressure, combustion and temperature controls. New furnaces of 45 tons capacity will be added to the present battery of six 30-ton furnaces. One of the new annealing furnaces is of the recirculating heat type for drawing and stress relief. The other is a four zone continuous type unit automatically controlled.

A new chemical and metallurgical laboratory and research department will dovetail the various manufacturing operations. The latest radiographic apparatus will be installed to test castings for interior defects. Plans call for completion of the program in 90 days without any stoppage of production during changeover period. Anticipated increase in production will amount to between 30 and 35 per cent.

Complete plant of the Bettendorf Co., Bettendorf, Iowa, with the foundry in the background

Data on Gray Iron Is Available

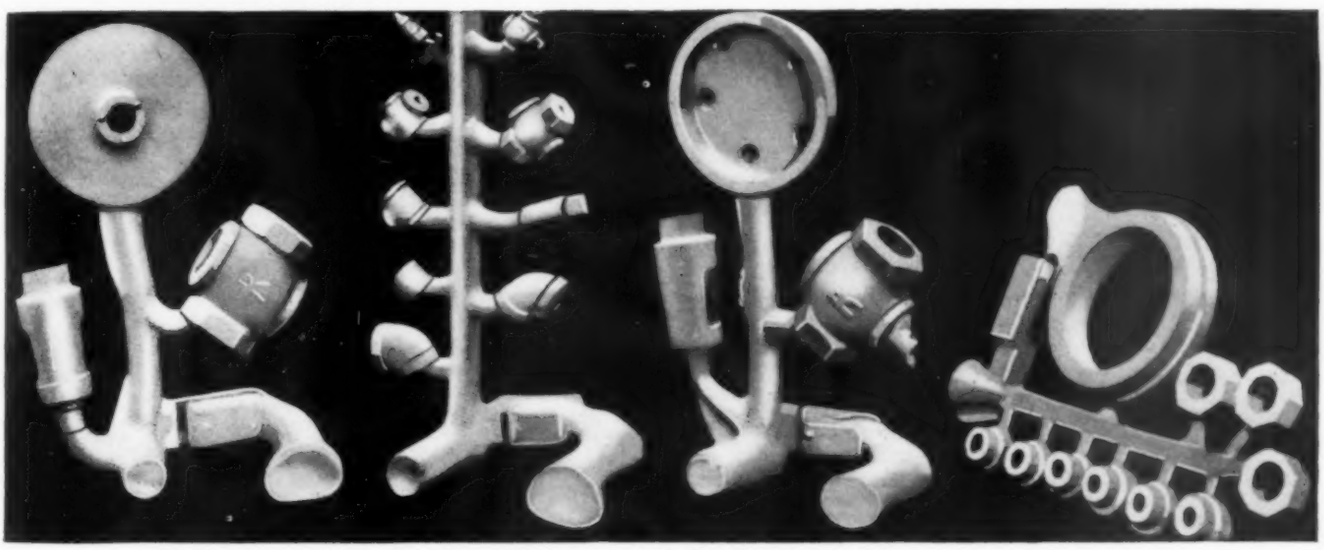
In 1939, an intensive survey of available basic information on engineering properties of gray iron castings was made for the Gray Iron Founders society by the Battelle Memorial institute of Columbus, O., and was published by the society under the title *The Engineering Properties of Gray Cast Iron*. The publication contains tables of properties for light, medium and heavy sectioned castings of various A.S.T.M. classifications. In addition the study presents many graphs and other tables dealing with individual properties. The book originally was published for private circulation among members of the Gray Iron Founders society, but recently the board of directors has decided to release a limited number of the entire industry at a cost of $10 per copy. The publication may be purchased through the society's headquarters at 1010 Public Square building, Cleveland.

Why not try EVERDUR METAL for tin-free, high-strength bronze castings

Cast Everdur Drainage Fittings

They are tough, sound, machineable, and produced with regular brass foundry equipment

Cast Everdur Valve Parts



Small Everdur Castings—Methods of Gating and Molding

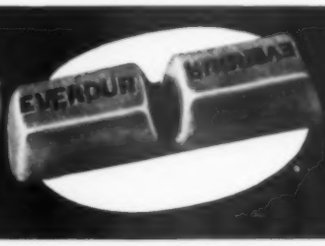
Everdur Metal is a development of metallurgical research in the field of engineering bronzes. For fifteen years, this tin-free, copper-silicon alloy has proved its value in the production of high-strength castings of both heavy and thin sections—for valves, fittings, and numerous other specialties.

Of great importance are Everdur's notable properties of corrosion resistance and ease of fabrication and handling in the foundry. The metal is furnished ready for use and can be melted and cast by regular brass and bronze foundry equipment...There are many other interesting details about the casting qualities of Everdur in a new bulletin. Ask for a copy. Just say: "Send me your new booklet on Everdur Ingots."

401-K2

ANACONDA
from mine to consumer

(TIN-FREE) Everdur Casting Ingots



THE AMERICAN BRASS COMPANY, General Offices: Waterbury, Connecticut
In Canada: Anaconda American Brass Ltd., New Toronto, Ont. • Subsidiary of Anaconda Copper Mining Company

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THE ADVENTURES OF BILL

By PAT DWYER

Drawings By RICHEY

WHILE reading some of the recent newspaper war news I came across a reference to a big gun which it was claimed could be set up on the seashore presumably on a good solid concrete foundation to prevent the recoil from burying the entire contraption in the sand. The range of the monster, one of these closely guarded confidential and well known military secrets, was hinted at as 150 miles, equivalent to an hour's flight of an airplane or three hours in a fairly fast train. A shell from this gun, we are informed could leave the muzzle at 10 a.m. and exactly 1 minute and 13 seconds later, that is 10-1-13, it would be scattering buildings, men, women and children in fragments in a peaceful city, name deleted by censor. Certainly this is a glowing tribute to the onward march of civilization. Twenty odd years ago the largest gun in existence could throw a shell a mere 75 miles.

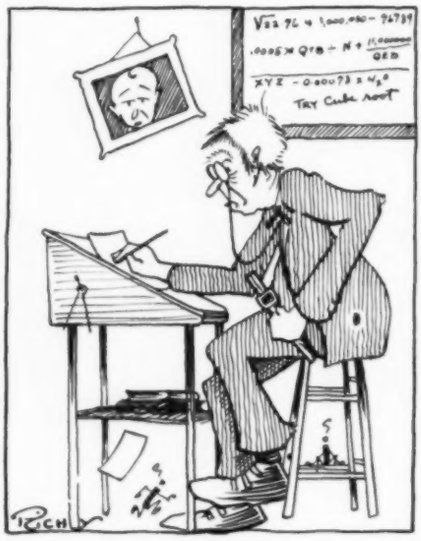
I made a mental note to drop into the public library the next time I passed that way and take a look at some of the masterpieces of scientific, mechanical and imaginative literature turned out 60 or 70 years ago by the late M'sieu Jules Verne. One of these described the construction of a huge cannon by boring a tunnel in the solid rock of a mountain some where in South Africa. The purpose was to shoot a projectile from the earth to the moon. The plan failed because the learned professor in charge of operations misplaced a decimal point some place in his abstruse calculations.

A second story described a monster cannon developed in Germany at the period the old hereditary enemies France and Germany still were snarling at each other over the results of the 1870-1871 Franco-Prussian war where France, figuratively speaking, lost its shirt and the emperor Napoleon III lost his job. Tough times, mes amis. Of a toughness, as you say to push out the eye!

Not satisfied with the ordinary military equipment for converting the French army into mincemeat, old Snarleyow, a reincarnation of Attilla, Ghengis Kahn and Bluebeard with a touch of Judas Iscariot thrown in for good measure, invented a gun which he fondly anticipated would destroy every living creature in a country impudent and insolent enough to indulge in long noses and other insulting gestures. In a happy ending to the story—English translation—old Raw Head and Bloody Bones was destroyed by his own invention.

Years and years before poison gas, submarines and air ships had been developed or brought to an operating stage, the piercing prophetic eye of the late Bro. Verne saw the boats functioning under the rolling waves and the great war birds circling, soaring and screaming in the air. All his prophesies have come true with the exception of the poison gas throwing big gun and the inventor. As a prophet Mr. Verne is still a pretty good bet. Life insurance companies are not competing for the privilege of writing a policy for the present man behind the gun.

Commenting idly on this subject the other night Bill said he was reminded of the old story of the three colored lads who at one period of a careless existence had done a hitch in the navy. A vulgar expression denoting that for a period of 3 years the speaker had enjoyed the privilege of free room and board and a moderate amount of folding money per month for keeping a warship in spotless condition. After the fashion of men, irrespective of color, each boy was inordinately proud of the ship in which he had served.



Figures, Joe, ain't always what they seem

"The first lad," said Bill, "claimed that his vessel held all navy records for fast and accurate shooting. At a distance of 5 miles and with the old battle wagon pitching in a heavy sea the gunners could knock the targets down as fast as they were put up. The second retired gob skilfully shifted the discussion to long distance shooting.

"'We has a gun,' sez he, 'on dat 'ere ship, de longes' gun Ah reckon evah wheeled out of a foundry or a blacksmith shop or whe'evah dey makes 'em. Dat gun could shoot a man down as fur away as de Captain could see him wit a pair o' glasses. Hot dog! Some shootin', what Ah mean!'

"The third old sea dog spat contemptuously 'Fair shootin', he admitted, 'for a bunch of amachoors. When I was in de RINGDANGDOO we didn't need to see no man to send a shell whistlin' through him. Supposin' we is slidin' in pas' de Viginiah capes an' de Seckt'y of de navy sends out a message to shoot him a certain pahty in Baton Rouge or N' Orleans or Kalamazoo. De gun crew swivels de long gun into position an' Wham! De man get's it. All de captain needs is de man's postoffice address. Da's all. Jis' de postoffice ad-dress. I ain't nevah seen 'em wo'kin' on a telephone numbah, but Ah guess dey could do if dey was pushed into a co'nah!'

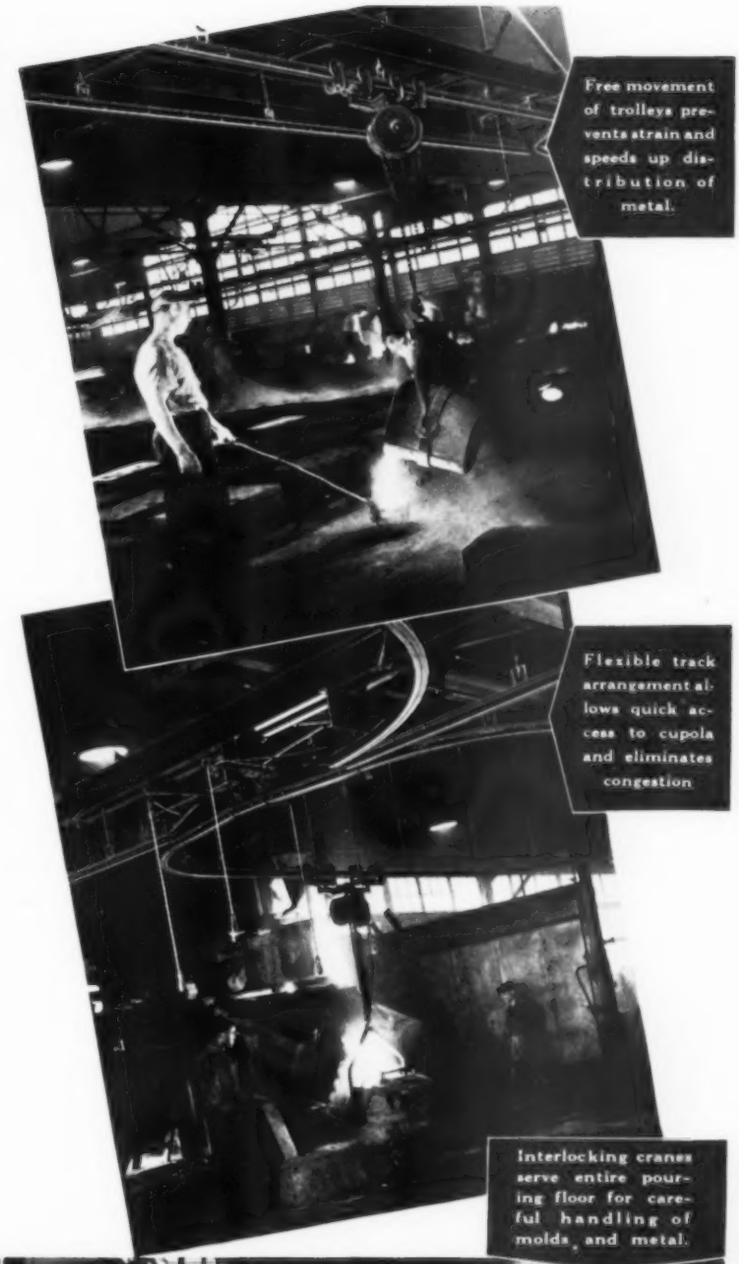
"Rather an odd coincidence," Bill continued, "that you should bring up this subject of big guns. I had a letter the other day from my old friend Fred Marchant in which he asked me to throw what light I had on certain features connected with the production of large castings. A skilful foundryman and a very nice writer Bro. Marchant steps up to

(*Continued on page* 66)

Simple Methods for stepping up Defense Production

With a surging demand for greater output, plants operating on defense materiel use every possible means to obtain it. It is no wonder that these plants are rapidly installing overhead handling equipment to relieve floor congestion...to gain time through process aids...or to conserve skilled manpower by eliminating handling fatigue.

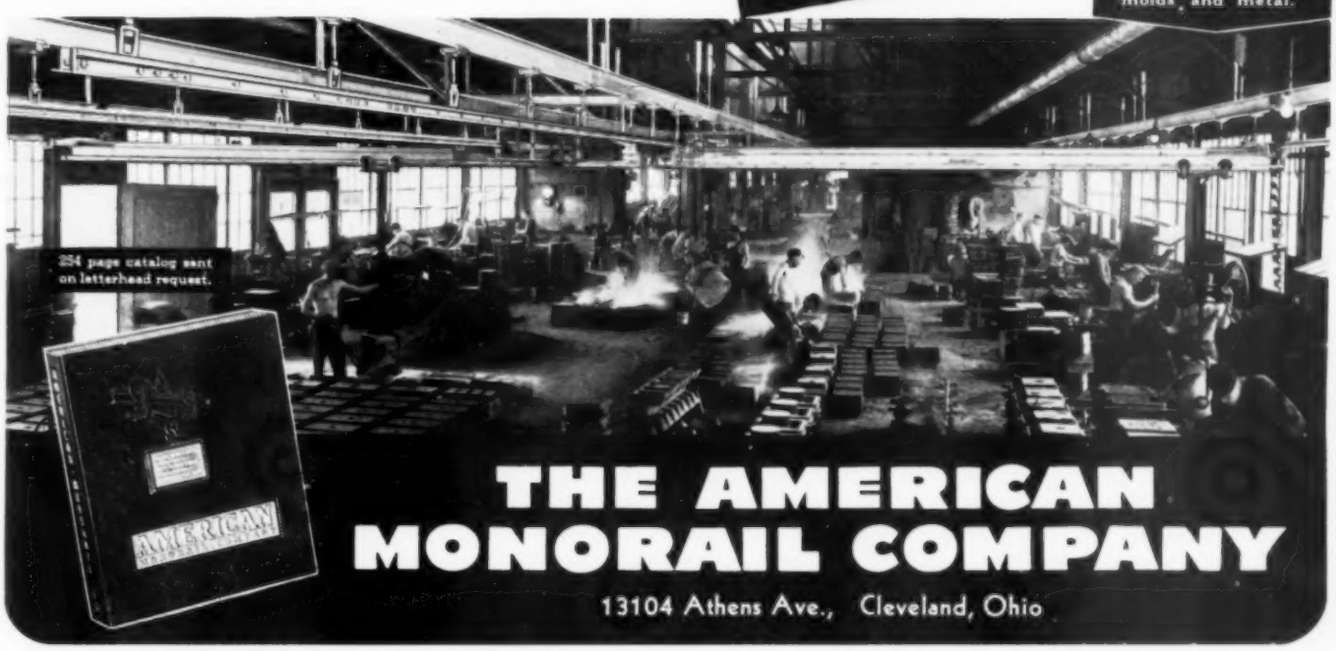
Simple systems as shown here are quickly and inexpensively applied wherever a short cut is needed. American MonoRail engineers can spot these places in a short survey of your plant. They will then offer a detailed proposal which does not obligate you in any way. Why not give them a chance to help push along your defense production?



Free movement of trolleys prevents strain and speeds up distribution of metal.

Flexible track arrangement allows quick access to cupola and eliminates congestion

Interlocking cranes serve entire pouring floor for careful handling of molds and metal.



THE AMERICAN MONORAIL COMPANY

13104 Athens Ave., Cleveland, Ohio

(*Continued from page* 64)

the plate, flexes his muscles and takes a whack at the old pill as follows."

"If the letter," I said, "is written in that weird baseball jargon, you can put it back in your pocket. After a whole summer of unwilling listening to the moronic radio patter I am in a condition corresponding to that of Johnny Holtott after his first week on a transport crossing the Western Ocean during the world war. Johnny claimed he was feeling fine and had enjoyed six meals every day. Three going down and three coming up. Let's have it in English."

"What's that saying about one man's meat and a second guy's poison and all that there kind of stuff? Tut, tut, my good man. I do my best to keep the conversation on a high moral plane and you drag in an illustration that sounds like something out of what's his name's Stinkpeck's best seller. None of that kind of tripe in Fred's chaste epistle. Listen.

" 'The other day a group of foundrymen were talking shop. One claimed that the largest casting ever made weighed 100 tons. I claimed that 100 tons was not an unusual weight for a casting. The largest of which we have any record was a 600-ton casting made in Russia. At one time I heard or read about a large casting poured some place in the eastern part of the United States. The casting took all the iron in the cupola. Not a drop left to feed 'er up. A hurried telephone call brought a 3-ton ladlefull on a flat car from another shop down the line. I recalled another instance where a man fell into a ladle of molten iron. The whole block of iron was buried in the cemetery. I was called a blinking liar. Nothing like that could happen. Presumably in your rambling all over the country these various items have come to your attention. I wish you would set your observations down in writing so I can confront these doubting Thomases and convince them of what is going on and what has been going on beyond their limited horizons.' "

"Well," I said, "so far as I can see Fred has all the aswers. All you had to do was to write him, 'You are right, Sir. You are ab-so-lute-ly right!' and let it go at that. Wow! Here I am quoting from another radio program that has irritated me more than a cinder in the eye. Shows you what constant repetition will do to a man. Pretty soon I am afraid I shall find myself talking like a parrot."

"Pretty soon, hey? My dear young fella ycu flatter yourself. If a man writes me a nice friendly letter and pays me the compliment of asking my opinion, or for a hunk of information I should consider myself singularly lacking in appreciation if I did not rise to the occasion to the best of my ability."

"You have been attending too many meetings recently," I said, "or reading too many political speeches. Look out. The virus of stringing words together to hide an idea, or to fill a place on the program is highly contagious. I do not know if the terms still are in use, but an old molder for whom I shoveled sand in my apprentice days, a man of few words, had a nice way of deflating one of these windy characters. 'Reminds me,' he used to say, 'of a young crow, all gab and g—,' well, let us say insides. He varied the term occasionally by comparing the speaker to a barber's cat, all wind and froth. If that letter had been sent to me—"

"Oh, sure! If that letter had been addressed to you, you would have cocked your feet up on the desk and dictated: Dear Sir: Replying to your esteemed favor of the 14th prox, beg to advise that to the best of my knowledge you are correct in all your statements. Your's, etc. Period. No carbon. That would not do for me. I get out the old tablet, moisten the end of the vest pocket pencil and write a proper letter. Listen to this:

I suppose some people might think a discussion of casting weights represents a loss of time. Maybe so. Maybe so. To foundrymen the subject always is interesting. Wait now 'till I put on the specs and see how the inquiry is set out. 1—Several foundries in the United States are equipped for and have made castings over 100 tons both in iron and steel. Within the past few years the Otis Steel Co., here in Cleveland has made anvils and other castings ranging in weight between 100 and 150 tons. About two years ago the same company cast the largest and heaviest roll housings ever attempted. Each casting weighed 175 tons.

2—Many instances are on record of metal being transferred, usually in an emergency, from one foundry to another. The instance to which you refer probably is based on an exploit many years ago by the famous Mike Cahill while gaffer in the City Foundry, Cleveland.

3—The Russian anvil block, estimated weight 600 tons, was cast in Odessa on the shore of the Black Sea about 1866. According to all accounts it is still in the mold in which it was cast. It is of interest to note that 48 American cupolas, McKenzie type—oval instead of round—were set up around the mold and in that manner a constant stream of iron was kept flowing until the mold was filled. I never saw any account of what became of the cupolas afterward.

4—Any reference to large castings must include the great bronze bell of Moscow, 19 feet in diameter 22 feet high and estimated weight 220

(*Concluded on page* 92)

Technique is fair, but not up to that of our high school and university boys after the team loses a game

Pittsburgh

FIRST fall meeting of the Pittsburgh Foundrymen's association took the form of a picnic, held Sept. 8 at Daniels' Paradise Gardens, just north of the city. Limited to members only, the affair brought out about a hundred men and was the first venture of the new entertainment committee headed by W. S. Scott, Pittsburgh Coke & Iron Co.

The first regular meeting, held Oct. 21 at the Fort Pitt hotel, scheduled Max Kuniansky, general manager, Lynchburg Foundry Co., Lynchburg, Va., with a talk on "Foundry Practice."—*R. L. Hartford.*

New England

REGULAR monthly meeting of the New England Foundrymen's association was held at Wentworth institute, Boston, Oct. 9. Dinner was served at the school's cafeteria. In the absence of Francis LeBaron, president of the New England Foundrymen's association Charles Butler of the Warren Pipe Co., and vice president of the association presided, and introduced Frederick E. Dobbs, principal, Wentworth institute. Mr. Dobbs welcomed those present and discussed briefly the purpose of that educational institution. He stated that at the present time there were 600 day students and 800 evening students attending the institute. The school was entirely of a technical nature, training men in practical arts. The idea of such a technical school originally came from England and probably is more prominent in that country today than here, where great stress is laid on a college education in preference to technical and practical studies. Mr. Dobbs explained that Wentworth now has a foundry course under the auspices of the government operating under the National Defense program, and at the present time there were 12 students in the course taken from W.P.A. and 11 from the ranks of the unemployed. At the conclusion of the address, guides were furnished the visitors and a tour of inspection of the institute was arranged. Departments of the school were working and the visitation proved to be most interesting. The meeting was arranged by Mr. Peterson of the institute.—*M. A. Hosmer.*

Wisconsin

APPROXIMATELY 185 members and guests were present at the first fall meeting of the Wisconsin Chapter of the A.F.A. held Sept. 20 at the Shroeder hotel, Milwaukee. Ben. D. Claffey, General Malleable Corp., Waukesha, Wis., and president of the chapter, presided.

Following an interesting film, shown through the courtesy of the American Metal Products Corp., President Claffey introduced the main speaker, Col. D. Armstrong of the Chicago ordnance district. His topic, "Industrial Mobilization," was received with much interest and enthusiasm by those present. Colonel Armstrong described the functions of the several ordnance departments spread throughout the states. Among the duties of those departments is the important one of knowing what equipment and material are procurable in their respective districts. In a production study made to determine the transformation necessary in shifting from one type of work to another, it was the desire of the department to help industry meet the high standards that are required for that type of work, and also to reassure and seek cooperation from all interested firms.

Due to the lack of a measuring stick tremendous surpluses were built up during the last war. The procurement plan under way at the present is designed to prevent the reoccurrence of such difficulties in the present rearmament program. Colonel Armstrong stressed the importance of educational orders, citing instances in which such orders expedited delivery at a much reduced final cost to the government. C. R. Messinger, president, Chain Belt Co., Milwaukee, and assistant chief of the ordnance department, elaborated on that detail. In concluding Colonel Armstrong stated that the ordnance office was ready for work and he felt that the Wisconsin district would soon feel the effect of the national defense program to a great extent.—*H. C. Waldron, secretary.*

Birmingham

THE Birmingham District Chapter of the A. F. A. held its fifth annual picnic at Pineview beach on Sept. 14. It was an all day affair with a total attendance of about 540, and was one of the best gatherings in the histroy of the chapter.

Lester N. Shannon, national presi-

Speakers' table at the September meeting of the Wisconsin chapter. Left to right, C. R. Messinger, president, Chain Belt Co., and past president of the A.F.A.; Col. D. Armstrong, executive officer, Chicago Ordnance district; and Ben D. Claffey, General Malleable Corp., Waukesha, Wis., and president of the Wisconsin chapter. Photograph courtesy of John Bing, A. P. Green Fire Brick Co., Milwaukee

Left to right — Lester B. Shannon, president, A.F.A., and W. O. McMahon, Sloss-Sheffield Steel & Iron Co.

dent, was there and "Leck" added greatly to the party. It was a full day and the committee had made arrangements so that everyone present could follow his particular form of entertainment. There was a slam bang softball game, bowling, horseshoe pitching and boating. Barbecue chicken and ribs were served at 1:00 o'clock and it certainly did taste good and hit the right spot.

Afterward the crowd gathered along the beach and saw an exhibition of diving and swimming. The various performers were amateur champions of the South and Southeast.

The committee in charge consisted of Joe Gilbert, chairman, Wayne Nelson, vice chairman, T. H. Benners Jr., R. A. Donaldson, W. Guy Bagley, J. Arthur Woody, W. J. Bach, Victor Szwed, E. C. Stewart and C. B. Saunders. The committee next year certainly will face a high mark.—*Jack Hayes, chairman of publicity.*

Conn. Nonferrous

FIRST technical session for the fall season of the Connecticut Nonferrous Foundrymen's association was held Sept 18 at the Indian Hill Country club, New Britain, Conn. D. Wesley Case, Belknap Mfg. Co., Bridgeport, Conn., and president of the association, presided at the meeting at which 44 members were present. Feature of the session was a sand symposium which was to have been directed by C. A. H. Knapp, metallurgist, Jenkins Bros., Bridgeport. However, due to illness in Mr. Knapp's family, the meeting was directed by Joseph Shannon of Jenkins Bros., also a member of the sand committee. Mr. Shannon was assisted by David Tamor, Reading Pratt & Cady division of American Chain & Cable Co., Hartford, Conn.; Don Sawtelle, Malleable Iron Fittings Co., Branford, Conn.; and S. W. Chappell, Electric Boat Co., Groton, Conn. The sand questionnaire which had been sent to the membership was thoroughly discussed and its aim, to assist the membership in solving problems caused by sand, was emphasized.

The problems committee was named and includes: Ernest F. Stove, Manning, Maxwell & Moore Co., Bridgeport, chairman; Benjamin Stewart, Bridgeport Deoxi-

(*Continued on page* 72)

Below—Barbecue picnic of Birmingham Chapter was a huge success with about 540 in attendance

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and increase efficiency

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(*Continued from page* 70)
dized Bronze & Metal Co., Bridgeport; S. W. Chappell, Electric Boat Co., Groton; and C. A. H. Knapp, Jenkins Bros., Bridgeport. Mr. Stone discussed the questionnaire which had been sent out by the problems committee, advising the group that its purpose is to assist the membership. Recipients may present their problems for open discussion at a meeting, or they will be assisted in private by the committee upon written presentation of their requests.

A golf tournament was held in the afternoon and winners of prizes were Alec Chrystall, Windsor, Vt.; C. H. Blanchard, Hartford; D. Wesley Case and Louis G. Tarantino, Bridgeport.—*Louis G. Tarantino, secretary.*

Cincinnati

AN INTERESTING and instructive description of recent developments in coremaking and mold drying practice was presented to approximately 65 members and guests of the Cincinnati Chapter of the A.F.A., at the regular monthly meeting Oct. 8, in the Hotel Alms, Cincinnati, by C. A. Barnett, president and general manager, Foundry Equipment Co., Cleveland.

With minor points and impromptu digressions, presentation of the subject was arranged in three main divisions: Sands and binders singly and in various combinations and at various temperatures; basic principles underlying the conversion of a weak and damp body of sand, into a smooth, compact firm object, a satisfactory component of a perfect mold; and the design, construction and operation of equipment for satisfactorily drying molds and cores under a wide range of conditions. The last feature was illustrated by a number of slides showing typical installations in every type of foundry.

Development in mold and core drying technique was shown up sharply in contrast between conditions prevailing today and those considered good enough in a former era when the core room bearing a close resemblance to a general storehouse after an air raid, was located in a dark unventilated corner of the shop in the dog house or in a flimsy shed or leanto with broken windows and a leaky roof. The crudely built oven was fired with soft coal and the joints of the door were daubed with mud at night. Cores and molds near the floor came out damp, while those higher up were burned. The modern clean, insulated oven may be fired with stoker coal, coke, gas, oil or electricity. Scientific control regulates the circulation of air, removal of moisture and maintenance of temperature at any required stage to ensure uniform product above and below. The core room no longer is Cinderella's kitchen.—*Henry M. Wood.*

Views taken at the Sept. 19 golf party of the Detroit Chapter of the American Foundrymen's association, which was held at the Pine Lake Country club. Photographs courtesy of Horace R. Bringhurst, Semet-Solvay Co., Detroit

Northern Iowa

SEPTEMBER meeting of the Northern Iowa Foundrymen's association was held at Black's tea room, Waterloo, Iowa, Tuesday, Sept. 24. Approximately 75 members and guests were present. Program for the meeting was arranged through the courtesy of Wisconsin Steel Co., Chicago, and presented by D. M. Terry and F. C. Varner, advertising department, International Harvester Co.

An interesting movie, "The Right Material in the Right Place," was presented as the first part of the program. The picture is somewhat of a birdseye view of steel plant operation showing the step by step process from the ore mine to the blast furnace and production of pig iron through the open hearth process and the rolling mills. Of particular interest were animated drawings and running narrative illustrating operation of blast furnace, cupola, air furnace, bessemer and open hearth. Various castings were shown made of malleable, gray iron or steel and the reason for using the various materials was explained. Second part of the program was the film, "Jungle Yachts in the Belgian Congo," which follows Commander Attilio Gatti on his expedition to darkest Africa in specially built International trucks and ultra modern trailers which were the only means of transportation.—*R. Wilke, secretary.*

St. Louis

FIRST fall meeting of the St. Louis District Chapter of the A. F. A., held Thursday, Sept. 12, featured a talk, "Research and Development in Cast Metals," by Dr. C. H. Lorig, Battelle Memorial institute, Columbus, O. Held at the Desoto hotel, the meeting was further featured by the attendance of approximately 100 foundrymen and friends—the largest attendance at any regular meeting held in recent years.

Doctor Lorig spoke on developments in casting of metals. Steel, gray iron, malleable and nonferrous

(*Continued on page* 74)

cleaning up afterward

Prevention is better than ~~cure~~

With a screen like this you can

Avoid dust nuisance in sand-cleaning

● Fully housed in and vented to a dust collector, this revolving screen in the plant of one of the country's nationally known radiator manufacturers cleans 60 tons of sand an hour with almost no dust loss at all. Flights on the inside lift the sand and drop it against the bottom breaking up the lumps. The screen may be provided if desired with a breaker section to break up extremely heavy, hard packed molds, also with an interior exhaust pipe for removal of fines. These screens are usually mounted overhead to save floor space but they may be placed at floor level. They handle dry, wet, hot, cold or any intermediate condition of sand and are available in sizes from 30″ to 84″ in diameter and different lengths to meet various requirements—eliminating any dust nuisance from sand cleaning at its source. Complete details, including prices, weights, capacities, etc., furnished on request.

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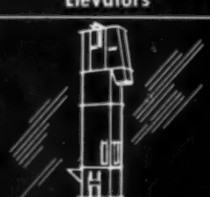
						

ADVERTISING PAGES REMOVED

(*Continued from page* 72)

casting problems were discussed and through the discussion period that followed various problems were presented and discussed.

Earlier in the meeting and immediately following dinner, talks were presented by Morris M. Hanson and Taylor S. Custer representing division of labor standards, United States department of labor, outlining briefly federal co-operation in apprentice training and the work of the federal committee on apprentice training.

Committee reports included a presentation of the program report by L. J. Desparois, apprentice training by George Mitsch and in the absence of Chairman R. K. Durkan, the secretary announced that the membershsip committee was pleased to report the adding of eight new members to the roll. Carl Morken reported that the chapter will provide an elementary foundry course, probably to be known as, "Fundamental Foundry Forum" embodying a series of 12 lectures by local foundrymen on 12 Wednesday evenings, beginning Oct. 23. Following each lecture will be a period of one hour devoted to discussion of questions brought up in the lecture. These meetings will be held at the auditorium of the Laclede Gas Light Co., St. Louis and judging from advance interest displayed will be featured by an extremely large attendance.

Meeting of the St. Louis District chapter on Oct. 10 was featured by the largest attendance at any regular meeting in the history of the chapter. One hundred and fifteen foundrymen and friends attended this dinner and special round table discussion period that followed.

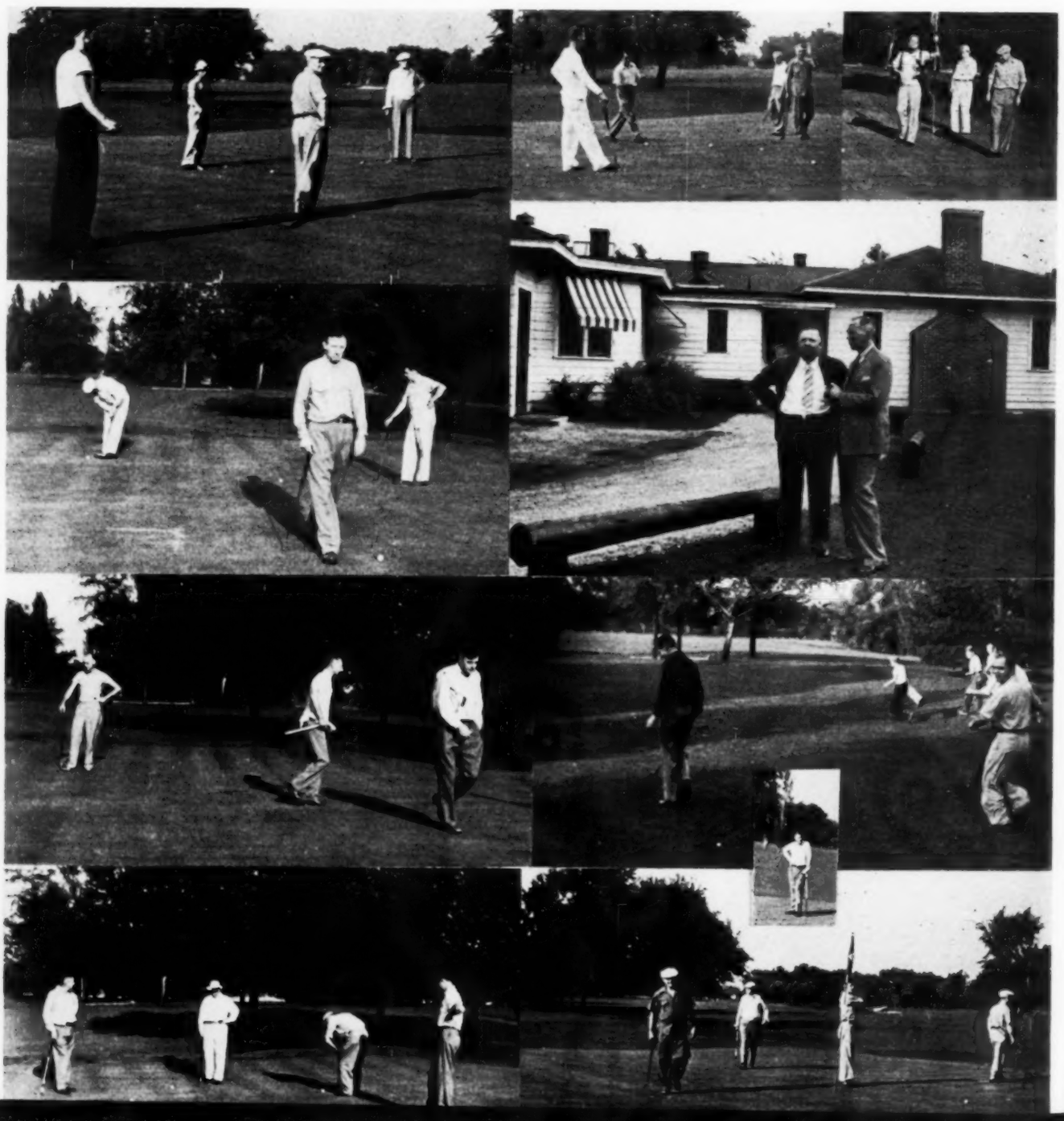
These discussion groups were separated into steel, gray iron and nonferrous sections. Don J. Reese, International Nickel Co., New York, spoke to the gray iron session on "High Test Cast Iron" and led in the active discussion period that followed.

Clyde Wyman, plant metallurgist, Oklahoma Steel Castings Co., Tulsa, Okla. spoke at the steel session on "Progress and Development of Manufacture of Electric Steel in Last Quarter Century." An active discussion followed this session.

The nonferrous section was in the form of a "Bring Your Own Problem Forum." J. W. Kelin, Federated Metals division, American Smelt-

(*Concluded on page* 77)

Detroit Chapter had a good turnout at its golf party on Sept. 19. Photos courtesy of F. A. Jensen, National Engineering Co., Detroit



(*Continued from page* 74)

ing & Refining Co., St. Louis, presided over this conference period. No set talk was given but the group attending brought sample castings as well as casting problems to discuss.

Following routine business during the course of the evening, such as presentation of the secretary-treasurer's report and report of standing committees, Carl Morken, Carondelet Foundry Co. presented a further report on progress of the St. Louis District Chapter Elementary Foundry Practice school.

Registration cards were passed out and the membership was urged to co-operate with the committee in stimulating interest in the school. An advance registration of 65 was reported at the meeting and many additions are being received.—*J. W. Kelin, secretary-treasurer.*

Chicago

MEMBERS and guests of the Chicago Chapter of the A.F.A. to the total of 800—a new record—attended the chapter's annual stag outing and golf tournament at swanky Lincolnshire country club, south of Chicago, on Saturday, Sept. 28. Favored by an ideal, warm, sunshiny day, nearly 400 played golf, the remainder divided their time between horseshoes, baseball and other arranged activities.

Late in the afternoon, Texas Rand's Rodeo put on a real wild west show featuring thrills, chills and spills. At seven, dinner was served in the Big Tent, specially put up for this occasion.

Immediately after dinner, a fine array of prizes was presented to the winners in golf and other sports, and to those who were fortunate enough to hold lucky numbers. A floor show and entertainment, featuring six high-class specialty acts, topped off the evening and brought the outing to a close.

Chapter officers and the outing committee deserve credit for the smoothness with which the day's program was conducted, for handling a crowd of such proportions is a complicated matter.

P. V. Martin, Carnegie-Illinois Steel Corp., was chairman of the outing committee, and H. Cullen, of the same company, was secretary. Serving with them were: J. H. Abbott, Hickman, Williams & Co.; B. J. Aamodt, National Malleable & Steel Castings Co.; W. E. Brewster, Wisconsin Steel Co.; H. A. Forsberg, Continental Roll & Steel Foundry Co.; D. N. Gellert, Nichol Straight Foundry Co.; J. G. Core, Werner G. Smith Co.; W. L. Hartley, Link-Belt Co.; M. F. Becker, Whiting Corp.; Roy A. Lindgren, Wisconsin Steel Co.; H. B. Hoge, Western Foundry Co.; Ed. Longenbeck, American Manganese Steel Co.; T. J. Magnuson, J. S. McCormick Co.; O. C. Olson, S. Obermayer Co.; Sidney E. McGinty, Burnside Steel Foundry Co.; J. H. Owen, Harbison-Walker Refractories Co.; W. C. Packard, National Engineering Co.; W. H. Parker, American Steel Foundries; H. Pfeiffer, Electro Metallurgical Co.; H. F. Henninger, International Harvester Co.; G. Kramer, American Manganese Steel Co.; W. C. Hitchins, Pyle National Co.—*Erle F. Ross*

N. Ill. and S. Wis.

PLANT visitation of the Fairbanks Morse & Co., Beloit, Wis., was one of the features of the regular meeting of the Northern Illinois-Southern Wisconsin Chapter of the A.F.A. held Oct. 8 in the employe dining room of Fairbanks Morse plant. Approximately 75 members and guests were present, and P. A. Paulson, Gunite Foundries Corp., Rockford, Ill. and chairman of the chapter presided.

Speaker of the evening was Earl Woodliff, Harry W. Dietert Co., Detroit, who discussed, "Sand Testing and Its Application to Foundry Problems." Mr. Woodliff gave an illustrated talk demonstrating the equipment manufactured by the Dietert company by using it on the lecture table. He tested samples of sand brought in by members from their various foundries, demonstrating the fallability of testing by feel alone, and stressing the importance of using skilled labor in tempering and cutting sand heaps as well as in mixing facing. Following his talk, Mr. Woodliff presided at a discussion of foundry sands and casting defects caused by faulty sand preparation.

Next regular meeting of the chapter will be held Nov. 12 at Hotel Freeport, Freeport, Ill. The speaker will be A. W. Gregg, Whiting Corp., whose subject will be, "Cupola Operation."—*J. R. Cochran, technical secretary.*

Northeastern Ohio

REGULAR monthly meeting of Northeastern Ohio Chapter of the A.F.A., Oct. 10 was attended by approximately 130 members and guests and featured three addresses on sand treating and handling; cleaning of castings, and core blowing.

Lester B. Knight Jr., vice president, National Engineering Co., Chicago, devoted the first part of his address to a general consideration of characteristics and application of molding sand in connection with production of salable castings. Competition of other materials and increased fastidiousness of customers has made it imperative that greater attention should be paid to surface appearance. Reliability of the castings, freedom from interior and exterior defects are needed to convince buyers of the superiority of castings over other materials in many instances. He cited a recent instance in which high officials of the army and navy definitely opposed the use of castings for certain purposes, a type of moss grown opposition based on the familiar official mass inertia and a total unfamiliarity with the strides made in casting manufacture in recent years.

Claiming that a recent survey indicated that 60 per cent of all cast-

Chicago Chapter reached a new attendance record of 800 at its annual outing. Photos courtesy of the American Foundrymen's association

ing losses could be traced to the sand, he emphasized the necessity of close and intelligent control. Obviously, he pointed out, satisfactory results can be secured only through the use of mechanical equipment. He referred to the four principal variables, permeability, moisture, bond strength and fines. Typical sand conditioning installations were shown on the screen and brief reference was made to a new installation in which sand is supplied continuously from a completely automatic unit.

Following a brief reference to the importance of thoroughly cleaned casting, F. A. Ebeling, sales manager, W. W. Sly Mfg. Co., Cleveland, elaborated on the methods in vogue, blast cleaning, tumbling, pickling and hand cleaning. He claimed the two latter might be dismissed from consideration. The pickling process is no longer practiced to any extent and hand cleaning is confined to the smallest foundries. Items to be considered in the installation of cleaning equipment include: Abrasive, labor, replacement, repairs, interest on investment, depreciation and power. The speaker elaborated on each of these items, and continued with a description of the various types of equipment used in blast cleaning. He claimed that several small barrels usually were more economical to operate than one large barrel. He pointed out the advantages of tables and blast rooms. The modern blast room is well illuminated, well ventilated, dust is kept to a minimum and is quickly and efficiently removed. Except under special conditions the usual air pressure of 100 pounds is not necessary. From 60 to 80 pounds is sufficient under the majority of conditions.

Russell F. Lincoln, sales manager, Osborn Mfg. Co., Cleveland, discussing core blowing machines, stated that the success of the process depended on three main factors, the machine, the corebox and the sand. With the first two designed, constructed and operated properly, sand mixtures may be developed to serve satisfactorily in a wide range of cores. With the aid of several slides he explained the principles of the machine, how it is operated and the many advantages it presents under favorable conditions. Up to the present machines have been built capable of producing cores weighing 50 pounds and measuring 36 inches in length. —*Pat Dwyer.*

Reading

FIRST meeting of the fall season was held by the Reading Foundrymen's association in a new meeting place, the Walnut room of the Berkshire hotel, Reading, Pa., on Sept. 17. The meeting was called to order at 7 p. m. by President E. J. Snell, with 88 in attendance.

The speaker of the evening was J. A. Gitzen, Delta Oil Products Co., Milwaukee, who discussed, "Cores, Core Binders and Core Washes."

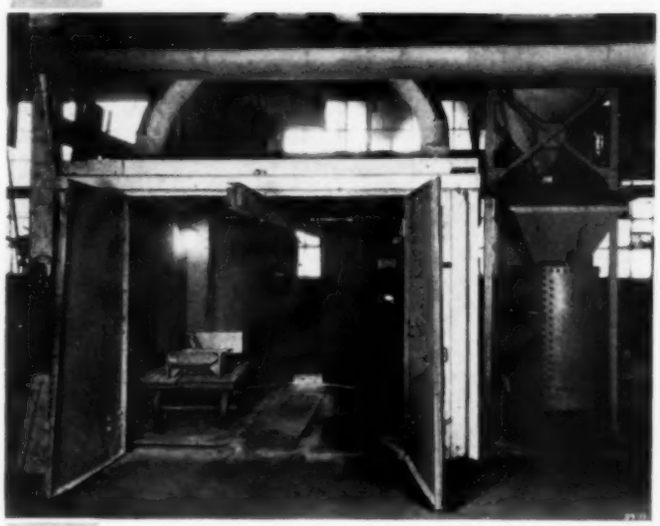
The subjects covered core binders of organic and inorganic chemical composition, their use and application in the making of cores and their characteristics in contact with molten metals. In considering core and mold washes, the speaker discussed the chemical reaction created by molten metals when in contact with various inorganic and organic

(*Continued on page* 80)

Views taken at the annual outing and picnic of the Chicago Chapter. Photographs by George Pope, The Foundry, Chicago

66 YEARS OF SERVICE TO THE FOUNDRY INDUSTRY

SEE SLY FOR SAVINGS IN BLAST CLEANING—



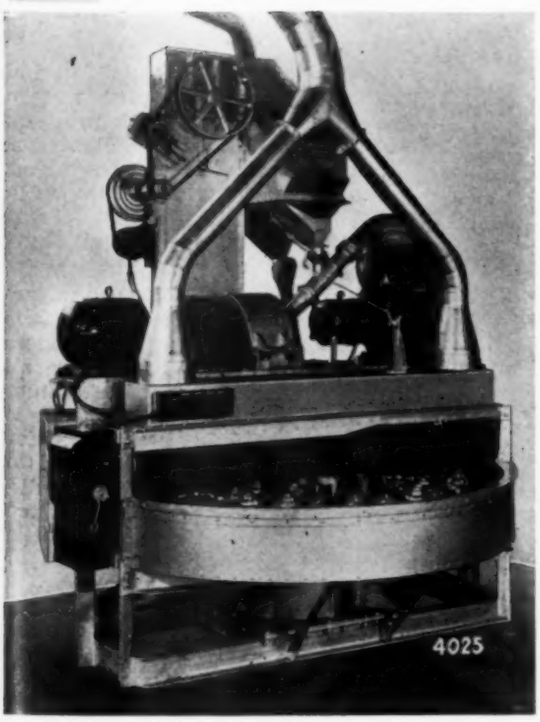
SLY BLAST ROOMS

These efficient cleaning rooms are widely used throughout the foundry field. Each one is specifically engineered to handle pieces of the particular weight and size, thereby achieving most efficient production. The rooms are ventilated to insure healthful, productive working conditions and so planned as to keep costs at a minimum.

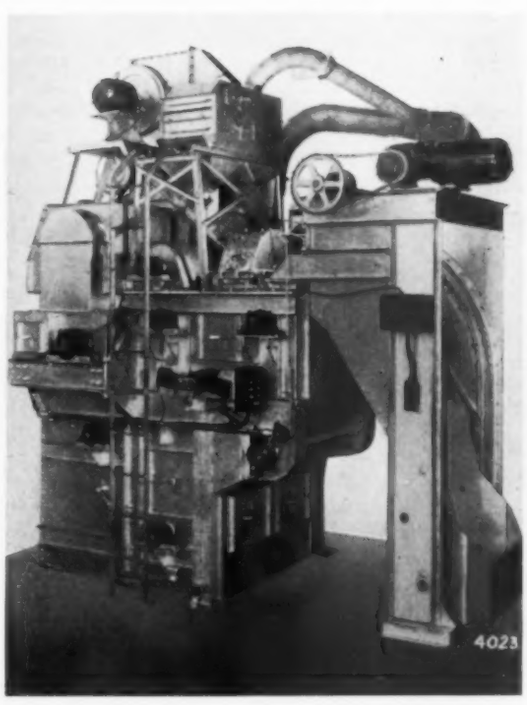
Featured at the left is a 10' x 10' Sly Blast Room with abrasive separator and pressure blast tanks. It was installed 15 years ago in one of Cleveland's leading foundries and is "still going strong" today.

Sly's long experience in the field is your guarantee of satisfaction.

SLY CENTRI-BLAST



These two airless blast cleaning machines are Sly's most recent contribution to better, more effective cleaning in this field. They clean by means of a powerful centrifugal blast wheel which eliminates the use of compressed air. It propels an extra large amount of abrasive at high speed resulting in faster cleaning and cleaner surfaces. At left—the Centri-Blast Rotary Table. At right—the Centri-Blast Mill. Ask for Bulletin 99 giving full particulars about this epoch-making Sly Centri-Blast.



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BLAST CLEANING EQUIPMENT · TUMBLING MILLS
DUST CONTROL EQUIPMENT FOR EVERY INDUSTRIAL PURPOSE

(*Continued from page* 78)

materials used in the manufacture of core and mold washes.

J. N. Ludwig Jr., metallurgist, Electro Metallurgical Co., New York, addressed the Oct. 15 meeting on, "Ferroalloys in the Metallurgical Control of Cast Iron."—*H. C. Cummings, secretary.*

Michiana

SECOND annual summer outing of the Michiana Chapter of the A.F.A. was held at LaPorte Country club, LaPorte, Ind., Sept. 14. Approximately 300 members and guests attended. Over one hundred played golf, several of whom had never played golf before. There was a crackerjack baseball game between the ferrous and nonferrous foundrymen, the nonferrous boys winning, the score 10 to 8. There was also a fly casting tournament, horseshoes and turtle races with a floor show to end the festivities. Representatives were present from the Chicago, Central Indiana and Cincinnati chapters.—*N. F. Hindle.*

Ontario

UNDER the leadership of Douglas Storie, Fittings, Ltd., Oshawa, Ont., and chapter chairman, over 110 foundrymen rallied at the first meeting of the Ontario Chapter of the A.F.A. on Sept. 27 to welcome H. S. Simpson, National Engineering Co., Chicago, and vice president of the A.F.A.

Taking as the subject of his address, "The Merchandising of Castings," Mr. Simpson presented some pertinent facts and then threw the meeting open for discussion. He believes that the foundry industry has been asleep in a merchandising sense while those interested in other forms of fabrication have spent thousands of dollars to bring greater engineering and public acceptance for their products. As a result, castings are given almost no consideration in the minds of many buyers and it is time for the foundry industry to educate users to the merits of castings.

One foundry has made remarkable advances in sales in recent years through a policy of taking engineering graduates, giving them a year of practical training in the foundry, sending them into the office for the acquisition of an understanding of costs, etc., and then sending them out on the road to sell castings through solving the problems of the user. This company recognized that it was no use making castings unless they could be sold, and their solution to the problem has been a most successful one.

Price enters too deeply into the selling of castings which should be sold as manufactured articles at so much a piece rather than as pig iron or nonferrous metal at so much per pound. Another practical illustration shows how a foundry met a difficult selling problem. A man took over a dilapidated foundry, applied metallurgy to its production problems, and sent some of his key men to college for a 2-year course. Finding that his customers knew very little about the particular type of castings which he produced, he brought them into the plant for a short intensive course. At his first short course on the application of his castings to his customer's needs, fifteen were present and it is a tribute to his foresight that 350 assembled for his latest 2-day study period.

Mr. Simpson believes that there was never a time which was more important in the history of Canada. He stated that foundries should look forward to a period of great expansion. The industry will grow most successfully if, in addition to technical development, it does all that is needed to increase and encourage sales. The technical man will make an excellent salesman if he is properly trained for it.

In the ensuing discussion which was largely devoted to the relative merits of piece vs. pound prices, interesting points were presented on both sides. Need for education of buyers in regard to castings and the service of the foundry industry was stressed. Few foundries are organized to sell to the best advantage.

It was announced that the membership of the Ontario chapter stood at approximately 88 and Membership committee chairman, S. R. Francis, Metals and Alloys, Ltd., called for a drive on the part of members to send the membership well over the one hundred mark before the end of the current season.—*S. R. Francis, secretary-treasurer.*

Highlights of the annual outing and golf tournament of the Chicago Chapter. Cartoon prepared especially for The Foundry by Jim Mikuta, Manufacturers Brass Foundry Co.

Philadelphia

ABOUT 125 members and guests of the Metropolitan Philadelphia Chapter of the A. F. A. attended the Oct. 11 meeting held at the Engineers' club, Philadelphia. Lee Harris introduced the after dinner speaker, Dr. Stanley P. Reimann, professor of pathology, University of Pennsylvania and director of cancer research at Lankenau hospital, who spoke on "What Is Being Done Today to Fight Cancer." It was truly a remarkable discourse.

Roger Keeley, Ajax Metal Co., and chairman of the chapter was in charge of the technical program and introduced Leroy P. Robinson, Werner G. Smith Co., Cleveland, and a national director of the A. F. A., who spoke on "Cores." It was one of the most practical talks presented to the chapter.

Mr. Robinson brought out the fact that it was essential that core sands be stored under cover, that binders are properly mixed and above all to know your ratios and moisture content—don't try to guess. There is also a definite mixing time for proper preparation of cores. It is a common error in foundries to disregard this and mix the sand too long. Improper baking and too little inspection are causes for a lot of foundry rejects. The speaker stated that a well controlled foundry never loses a casting on account of a core—for if a core is no good it should be thrown away so it cannot be used.

A lively question and answer period followed this talk and many of our members and guests participated. C. E. Hoyt, executive vice president of the A. F. A. was pres-

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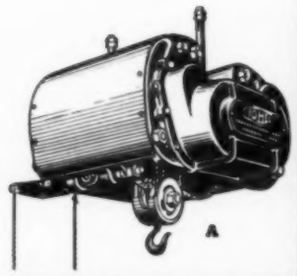

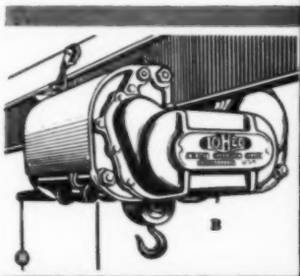

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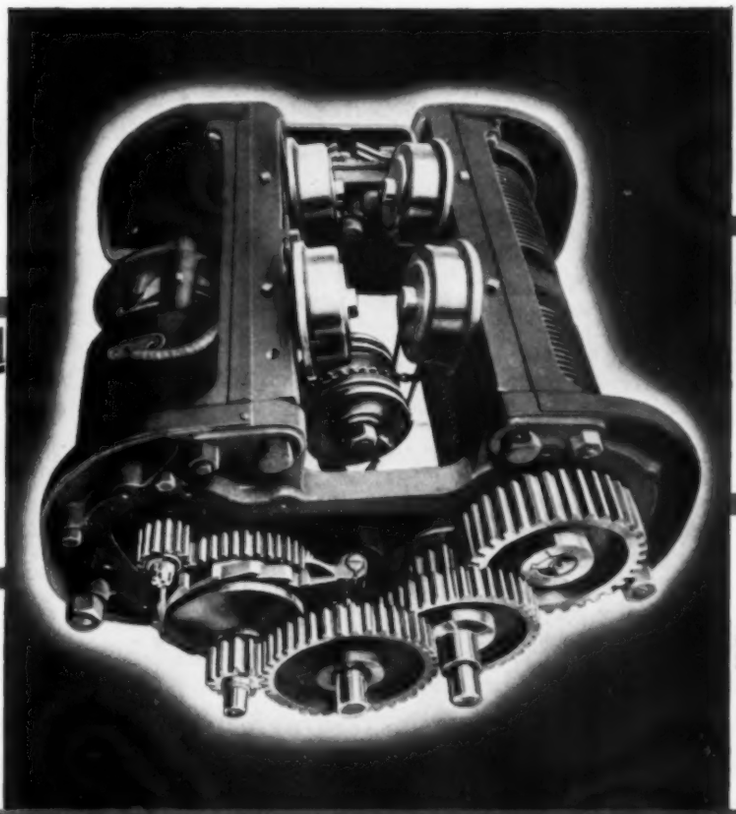

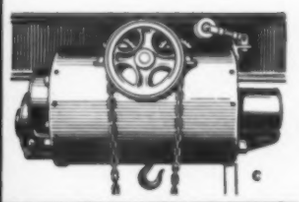

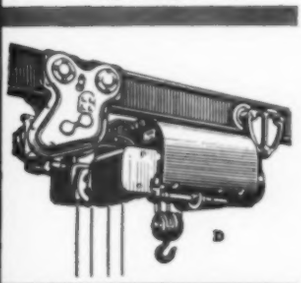

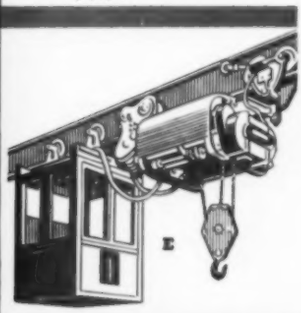

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(*Concluded from page* 80)

ent and responded to an invitation to address the meeting.—*J. T. Fegley, chairman, publicity committee.*

Southern California

FIRST meeting of the new season of the Southern California Chapter of the A.F.A. was held Sept. 26 at the Clark hotel, Los Angeles. A. Lee Bennett, Gladding McBean Co., Los Angeles, a ceramic engineer in the company's research division was principal speaker. Mr. Bennett gave a history of refractory materials found in California and stressed the fact Southern California had deposits of all types of refractories. He gave a fine talk on the many materials manufactured by his company and showed samples.

G. B. Emmett was officially installed as vice president of the chapter and W. D. Bailey Jr. as a director.

The entertainment committee showed a picture, "Tobacco Land," detailing the growing of tobacco, and another picture showing the making up of a radio program entitled, "Pleasure Time." More than 90 foundrymen and their friends were present at the meeting.

Next chapter meeting will be Nov. 21.—*W. F. Haggman, secretary.*

Baltimore

OVER 50 representatives from foundries in the Baltimore district met at the Lord Baltimore hotel, Baltimore, Monday, Oct. 14 and voted to petition the American Foundrymen's association for a chapter covering the Chesapeake district. R. T. Covington, foundry superintendent, American Hammered Piston Ring division, Koppers Co., Baltimore, was appointed chairman of the nominating committee to select officers for the proposed chapter. A committee also was appointed to prepare by-laws and regulations and to decide on future meeting nights.

The address of the evening was presented by L. P. Robinson, Werner G. Smith Co., Cleveland, which dealt with, "Core Room Problems." Robert E. Kennedy, secretary of the A.F.A. also was present and he explained the purposes of the A.F.A., the mechanics of organization and other problems pertaining to chapter activities.

Meeting to complete the organization of the chapter will be held in November.

Hold Foundry Course In St. Louis

St. Louis District Chapter of the A. F. A. this year is presenting a series of lectures and discussion forums, a form of school in elementary foundry practice arranged in three main divisions: Drawings, how to read them; sands and facings; and gating and risering. Three sessions will be devoted to the first, three to the second and six to the third. Sessions from 7:30 to 9:30 p.m. begin Wednesday Oct. 23 and will run consecutively with the exception of the Wednesday before Thanksgiving and Christmas, eight sessions this year and four in January. Copies of each lecture will be distributed to each audience in advance of presentation. Whether present or not all paid registrants will receive printed copies of the entire course of lectures. The fee has been set at $2 for the lecture course.

Formal registration will be required and attendance records will be kept at each session in the auditorium of the Laclede Gas Light Co. Attendance will be creditable on the 144 hours per year of related instruction required of foundry apprentices enrolled in apprenticeship sponsored by the United States department of labor. Committee in charge of the course includes: Carl H. Morken, chairman; Fred Riggan; Webb L. Kammerer; W. Carter Bliss; L. J. Desparois; J. W. Kelin. The program follows:

Oct. 23—"Removing the Mystery From the Blueprint," W. Carter Bliss, works manager, Scullin Steel Co.

Oct. 30—"Translating the Drawing to the Pattern Shop," Thomas H. Ross, David Rankin Trade school.

Nov. 6—"The Drawing from the Foundryman's Point of View," R. A. Jacobsen, general superintendent, Carondelet Foundry Co.

Nov. 13—"Sand Testing," R. A. Jacobsen.

Nov. 30—"Natural Molding Sands," T. C. Hamlin, superintendent, United States Radiator Co., Edwardsville, Ill.

Dec. 4—"Synthetic Molding Sands," (Lecturer not assigned).

Dec. 11—"What Happens When Casting Cools and Freezes," Fred Riggan, Key Co.

Dec. 18—"Light Gray Iron Castings," C. B. Shanley, Semi-Steel Castings Co.

Jan. 8—"Gating and Risering High Test Iron Castings," C. H. Morken, Carondelet Foundry Co.

Jan. 15—"Gating and Risering Steel Castings," (Not assigned).

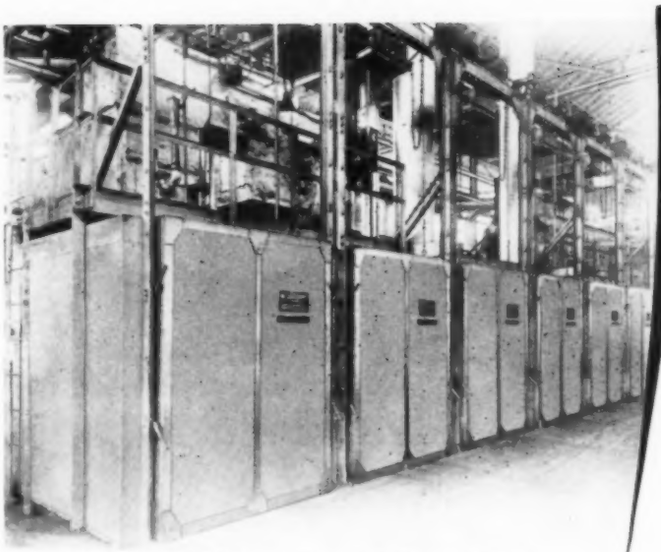
Jan. 22—"Use of Chills for Controlling Shrinks in Castings," William McKee, Key Co.

Jan. 29—"Molding Machines and Their Uses," C. R. Culling, vice president Carondelet Foundry Co.

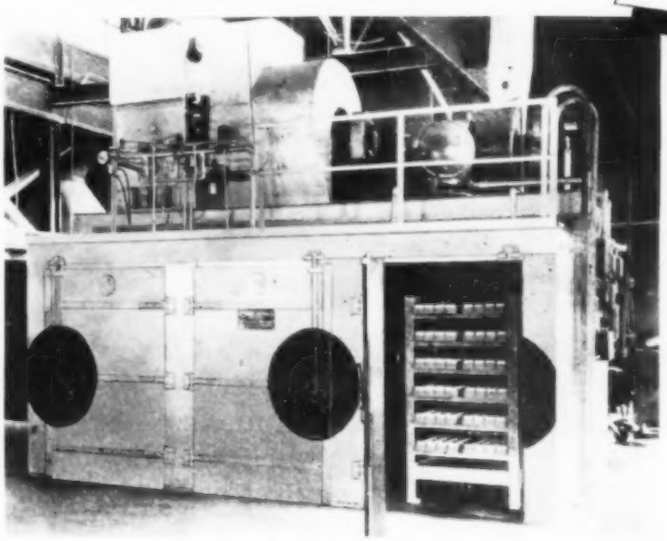
Use of a 2 to 4-minute dip in a special solution is said to provide a low cost method of plating aluminum and its alloys when an alkaline bath is employed.

The diorama, which formed the main part of the Whiting Corp. exhibit at the Chicago convention and exhibition, illustrated melting by the air furnace, bessemer and cupola, the foundry molding floor, and the stock storage yard and handling equipment

LEADING *foundries use* COLEMAN TRANSRACK CORE OVENS *for* PERFECT BAKING *at* LOWEST COST



Battery of six Coleman Transrack Ovens at The McKinnon Industries, Ltd., St. Catherines, Ont.



Battery of three Coleman Transrack Core Ovens at Jamestown Malleable Iron Corporation, Jamestown, N. Y.

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Are also built in the following types:

PORTABLE, ROLLING DRAWER, CAR, TOWER AND HORIZONTAL CONVEYOR

Coleman Ovens assure dependable results with whatever fuel is most economically available at your plant. There is no need to select costly fuels in order to get proper baking.

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Thirty-five years of specialization and a background of over 5,000 successful core and mold ovens are back of every Coleman Oven.

Fully guaranteed in every respect—No divided responsibility.

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CORE AND MOLD OVENS

TALK IT OVER...THINK IT OVER...

THEN...

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TALK IT OVER . . . Current foundry production necessitates an up-to-date knowledge of new foundry practice and equipment. The FOUNDRY constitutes a quick route to a variety of material on production and jobbing methods which would be valuable to your foundry as a whole. Talk over the idea of entering additional subscriptions to The FOUNDRY. Make sure that key men, whose duties require them to be up-to-date, have every available source of material at hand for quick reference or thorough study.

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PENTON BUILDING

CLEVELAND

BELLE CITY EMPLOYES FORM VETERANS CLUB

FORTY-TWO veteran employes of the Belle City Malleable Iron Co. and its sister organization, the Racine Steel Castings Co., Racine, Wis., recently formed a 25 Year club of veterans in the two companies. The old timers, with a total service of 1339 years, elected Frank Hady president of the club. Mr. Hady, with the longest service record of all the employes—48 years—never missed a day's work because of illness. James Blatz, with the next longest service record, was elected secretary of the club.

C. S. Anderson, president, Belle City Malleable Iron Co. who acted as toastmaster, praised the veterans for their long record of service and their loyalty to the companies. Mr. Anderson declared that the value of such employes cannot be measured in dollars and cents. Industry today needs and sincerely appreciates the faithfulness and service that such men have shown and are showing at your jobs every day.

Judson F. Stone, Chicago, and chairman of the board of the Belle City company with a service record of 33 years, reminisced of the old days in the foundry business and declared that the companies were honored and grateful to have employes with such long records of faithful service.

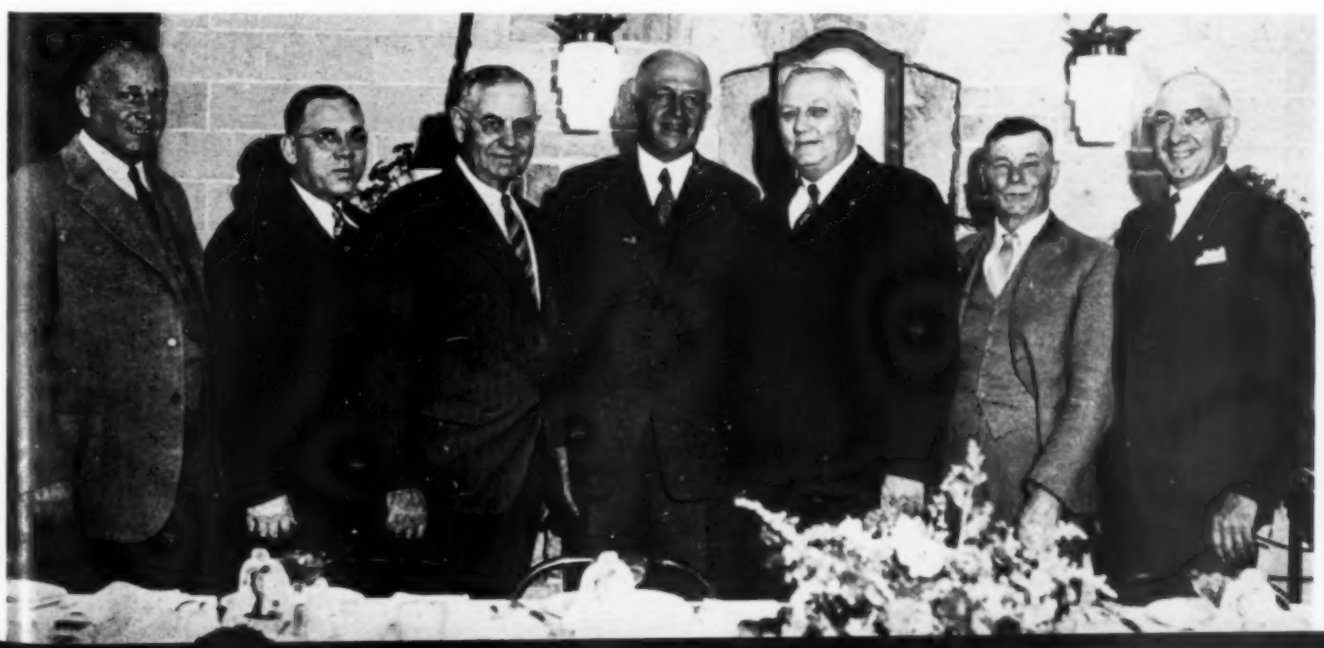
Highlight of the evening was the showing of color movies of the veterans at work which were made for the occasion by the Manufacturers' Association of Racine.

The veteran employes group comprises 18 members in the 25 to 30 year service group, 12 in the 30 to 35 group, five in the 35 to 40 group, five in the 40 to 45 group, and two in the 45 to 50 year group.

Mrs. Elizabeth Vash is the only woman member of the group, having been an employe in the core-room of Belle City for 25 years.

At each annual employes' meeting, those with 25 to 30 years of service are given a small gold bell shaped pin, 30 to 35 years service have a blue sapphire stone set in the pin, 35 to 40 years of service have a red ruby stone set in the pin and 40 to 45 years of service have an emerald stone, and over 45 years of serv-

Above—Left to right, Judson F. Stone, chairman of the board, Belle City Malleable Iron Co.; Frank Hady, a 48-year veteran just elected president of the 25-year club, and C. S. Anderson, president of Belle City with silver plaque containing names of all veterans. Below—Left to right, Judson Stone, vice president of the firm; Stanley Kitto, treasurer; James Blatz, 46-year veteran; Judson F. Stone; Nick Jolman, retired superintendent (33 years); Frank Hady, and C. S. Anderson



ice a diamond set in the pin.

All employes with 40 or more years of service receive gold watches in addition to the pins.

Seven employes have been given gold watches since the inception of the award policy. They are Frank Hady, James Blatz, Andrew Paulson, Edward A. Michna, John Michna, Joseph Misak, and George Porcaro.

The following employes are members of the 25-year club:

	Years of Service
Frank Hady	48
James V. Blatz	46
Andrew Paulson	43
Edward A. Michna	41
Joseph Misak	40
John Michna	40
George A. Porcaro	40
Frank L. Porcaro	39
Ralph Toth	35
Charles A. Finn	35
Andrew J. Hezzy	35
Nels Hanson	35
Gustav T. G. Bethke	34
Frank Supko	34
Judson F. Stone	33
N. E. Jolman	33
Cherubino Tempesta	32
Pericle Giacinti	32
Mike A. Principe	32
Hans P. Hanson	31
A. Spangenberg	30
August Beneditti	30
Gregorio Bencriscutto	30
Olimpiede P. Venturini	30
Emil Spreeburg	29
George M. Goepfert	29
Louis Deluca	29
William S. Langel	29
Varteres Garougian	28
Joe B. Smith	28
Anthony F. Litrenta	27
Sarkis Dersimonian	27
Jorsef J. Janaszek	27
Ernest Kahl	26
Charles S. Anderson	26
Louis Sabo	26
Elizabeth G. Vash	25
Joe Palermo	25
Sarkis Michalian	25
Elmer Bohn	25
John Palatino	25
Charles Stefka	25

James Lockwood, Rockford, Ill., showed colored movies of "Under Water Scenes in Florida" to the group.

A.F.A. Apprentice Contest Planned

Apprentice training committee of the American Foundrymen's association again will sponsor competition in molding and patternmaking for the 1941 convention. These contests were started in 1924 and have been especially successful in building up interest in organized trade training. Indication to the response to the program is found in the fact that over 140 foundries and pattern shops had apprentices entered in the competition for 1940.

The competition for 1941 will be held in four classes, namely, gray iron molding, steel molding, nonferrous molding, and patternmaking. First, second and third prizes of $30, $20, and $10 respectively, will be offered to the winners in each of the four classes. While contests will be held in the various foundry centers to determine local winners, final judging will be held during the 1941 convention.

The committee in charge of competition is under the chairmanship of S. M. Brah, industrial co-ordinator, International Correspondence schools, Chicago. Other members of the committee are as follows: Frank C. Cech, pattern instructor, Cleveland Trade school, Cleveland; H. L. Charlson, assistant superintendent, American Steel Foundries, East Chicago, Ind.; J. G. Goldie, foundry instructor, Cleveland Trade school, Cleveland; J. Morgan Johnson, vocational supervisor, Tri-City Manufacturers association, Moline, Ill.; and C. W. Wade, factory training supervisor, Caterpillar Tractor Co., Peoria, Ill.

Any regularly indentured apprentice is eligible to compete. Those desiring copies of the regulations governing the contest may secure them from the secretary, apprentice training committee, American Foundrymen's association, 222 West Adams street, Chicago.

Obituary

Morrison Mills, 37, eastern district sales representative, Chain Belt Co., died recently in Philadelphia. Mr. Mills was born at Calumet, Mich. and graduated from the engineering school of Harvard university.

* * *

John Gessner, 64, retired secretary and auditor, Milwaukee Steel Foundry Co., Milwaukee died in that city recently. He was associated with the company 17 years until his retirement in 1935.

* * *

S. Everett Sproul, 78, president, Penn Steel Castings Co., Chester, Pa., died at his home Sept. 18. Mr. Sproul was a brother of the late William C. Sproul, former governor of Pennsylvania.

* * *

Albert C. Muff, treasurer and manager, Commercial Iron Works of Los Angeles, died Sept. 13. Mr. Muff was born in St. Louis, Oct. 3, 1878, and had been associated with the Commercial Iron Works since 1907. He was a former director of the Gray Iron Founders' society.

* * *

C. W. Carolin, 79, president, Enterprise Foundry Co., Detroit, died recently. Mr. Carolin was one of the original founders of the company which was organized in 1896. A son, Walter E. Carolin is associated with the Enterprise company.

* * *

Sir H. C. H. Carpenter, 65 professor of metallurgy, Royal School of Mines, Imperial College of Science and Technology, London, died in Swansea, Wales, Sept. 15. Professor Carpenter was one of the founders of the Institute of Metals, and from 1918 to 1920 was president of the institute. He also was past president of the Iron and Steel institute, Great Britain.

* * *

Sir Robert Hadfield, internationally known engineer and metallurgist, died in London, Eng., Sept. 30. Mr. Hadfield was the inventor of silicon steel, manganese steel, and many other alloys and metallurgical improvements, for which he was honored by many foreign governments and scientific societies. He was chairman of Hadfields Ltd., Sheffield, Eng.

Health Conference

American Conference on Industrial Health will be held at the Towers club, Chicago, Thursday, Nov. 14 under the sponsorship of the American Association of Industrial Physicians and Surgeons. The meeting will be devoted to the correlation of viewpoints of all persons who are interested in promoting industrial health including employers, physicians, industrial hygienist, labor representatives, psychiatrist, insurance company representatives, public relations men, safety expert, and lawyers. Dr. Clarence O. Sappington and Dr. Edward C. Holmblad are co-chairmen of the committee arranging the meeting. Speakers will include Dr. Morris Fishbein, editor of the American Medical association journal; B. C. Heacock, president of the Caterpillar Tractor Co., Peoria, Ill.; Dr. Volney S. Chency, medical director of Armour & Co., Chicago; and J. M. Conway, representing the National Association of Manufacturers, New York.

* * *

American Management association, 330 West Forty-second street, New York, has issued a booklet entitled, "Practical Techniques of Industrial Training." Topics discussed include: "Adapting Training Courses To Meet the Present Special Needs," by L. D. McDonald, vice president, Warner & Swasey Co.; "Preparing High School Graduates and Others for Skilled Work in Industry," by Frederick E. Searle, superintendent, Henry Ford Trade school; "How To Teach Foremen To Teach," by R. D. Hayes, assistant director of personnel relations, American Rolling Mill Co. Copies may be obtained for 50 cents.

"When buying Ferro-Alloys
choose carefully your source
of supply"

Ohio Ferro-Alloys Corporation
Canton, Ohio

Foundry Activities

MEECH AVENUE FOUNDRY, 9906 Meech avenue, Cleveland, has built a new office and is considering the erection of a new addition 30 x 60 feet to care for an increased volume of business.

* * *

John C. Kupferle Foundry Co., 2822 North First street, St. Louis, is building an addition to its plant.

* * *

Clio Foundry Inc., Clio, Mich. has been incorporated to operate a pattern and machine shop and foundry, by H. J. Calkins.

* * *

Utility Electric Steel Foundry, 3334 East Slausen avenue, Los Angeles, has secured permit to build a new building at the cost of $4500.

* * *

Malleable Iron Range Co., Beaver Dam, Wis. is building a 2-story addition to its plant 98 x 252 feet. R. R. Boyd, 112½ South Spring street, is architect.

* * *

Die Cast Corp., 668 Hawthorne street, Glendale, Calif., is building an office and factory building to consist of 18,000 square feet of floor space and to cost $30,000.

* * *

Public Service Brass Corp., 2901 Slauson avenue, Los Angeles, is improving and altering its plant and office building at an approximate cost of $22,000.

* * *

Aluminum Co. of America, 5151 Magnolia street, Los Angeles, is altering and improving its foundry building at an approximate cost of $12,000.

* * *

Reliance Pattern Works, 4417 West Carrell street, Chicago, is building a one story plant at 4352 West Chicago avenue at cost of approximately $10,000.

* * *

Federated Metals division, American Smelting & Refining Co., 4010 East Twenty-sixth street, Los Angeles, is building a bag house and cupola house to cost approximately $48,000.

* * *

William A. Hardy & Sons Co., Fitchburg, Mass., recently increased its group insurance program, in force since April, 1926, to include a plan of hospitalization and surgical operation benefits, according to Chester Hardy, treasurer of the company. The entire plan is being underwritten by the Metropolitan Life Insurance Co., on a co-operative basis between the employe and the employer.

* * *

Sales index of foundry equipment during August, according to the recent report of the Foundry Equipment Manufacturers association, Cleveland, was 165.4 as compared with 194.4 in July.

* * *

Wright Aeronautical Co. has built a magnesium foundry for the manufacture of castings for aircraft at Fairlawn, N. J., as a part of a $1,000,000 expansion program to round out national defense facilities.

* * *

Vultee Aircraft division, Aviation Mfg. Corp., 842 Lakewood boulevard, Downey, Calif., has secured a building permit for the construction of a new foundry to cover an area 23 x 90 feet and to cost $3500.

* * *

Conemaugh Iron Works, Blairsville, Pa., recently was sold to the Kulka Iron & Metal Co., Alliance, O. The new owners plan to leave the buildings and necessary maintenance machinery intact for at least 1 year, while efforts are made to sell the plant to some industry that will operate it. Surplus machinery, scrap iron and other property, included in the purchase, will be sold. The iron foundry was incorporated in 1889 and passed through several hands before it became known as the Conemaugh Iron Works in the early 1920's. It was closed in 1934, a new company was formed to operate it in 1937, but the plant has been idle since December, 1938.

* * *

National Bronze & Aluminum Co., East Eighty-eighth street and Laisy avenue, Cleveland, is reported to be reorganizing with outside interests. Additional capital is for a plant addition to be built immediately to care for increased production.

* * *

Modern Pattern Co., 3023 Snelling avenue, Minneapolis, is building a new foundry to contain heat treating furnace, melting furnace and similar equipment. The company is licensed by Dow Chemical Co., Midland, Mich., to produce magnesium castings for airplane use.

RAW MATERIAL PRICES
Oct. 16, 1940

Iron	
No. 2 foundry, Valley	$23.00
No. 2 Southern Birmingham	19.00
No. 2 foundry, Chicago	23.00
No. 2 foundry, Buffalo	23.00
Basic, Buffalo	22.00
Basic, Valley	22.50
Malleable, Chicago	23.00
Malleable, Buffalo	23.50
Charcoal iron, furnace	27.00
Coke	
Connellsville beehive premium	$5.75 to $6.30
Wise county beehive coke	5.50 to 6.50
Detroit by-product delivered	11.00
Scrap	
Heavy melting steel, Valley, No. 2	$20.00 to $20.50
Heavy melting steel, Pittsburgh, No. 2	19.50 to 20.00
Heavy melting steel, Chicago, Auto No. 2	16.00 to 16.50
Stove plate, Buffalo	17.00 to 17.50
Stove plate, Chicago	13.00 to 13.50
No. 1 cast, mchy., New York	17.00 to 17.50
No. 1 cast, mchy., Chicago	17.00 to 17.50
No. 1 cast, Pittsburgh	20.50 to 21.00
No. 1 cast, Philadelphia	22.00 to 22.50
No. 1 cast, Birmingham	16.50
Car wheels, iron, Pittsburgh	21.50 to 22.00
Car wheels, iron, Chicago	20.00 to 20.50
Railroad malleable, Chicago	23.00 to 23.50
Malleable, Buffalo	22.50 to 23.00
Nonferrous Metals	**Cents per pound**
Castings copper, refinery	12.12½
Straits tin	51.75
Aluminum, 99 per cent	18.00
Aluminum, No. 12 (Secondary, standard)	14.50 to 15.00
Lead, New York	5.50
Antimony, New York	14.00
Nickel, electro	35.00
Zinc, East St. Louis, Ill	7.25

War Results

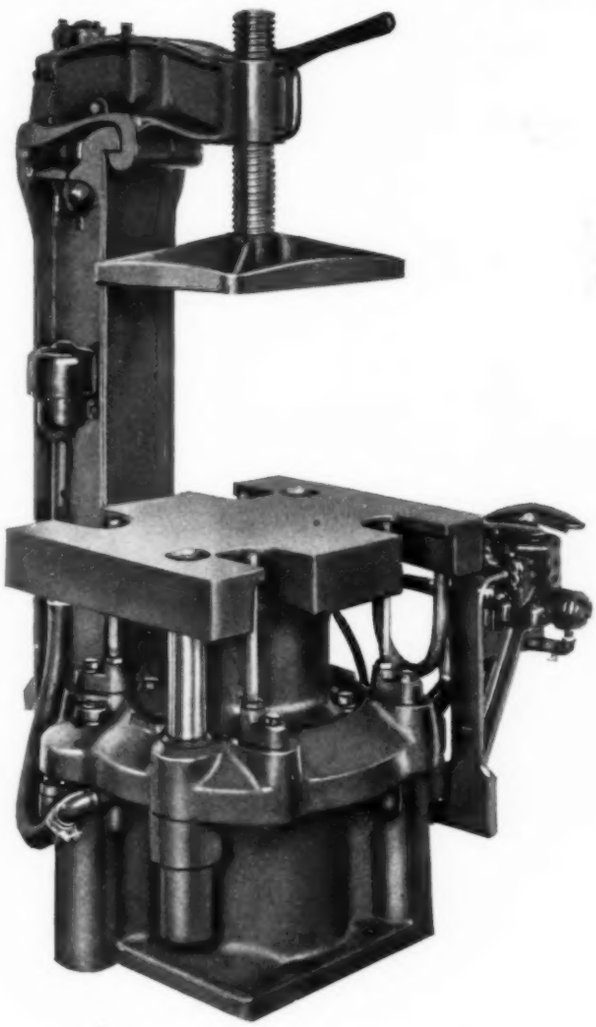
The following, from a recent issue of *The Foundry Trade Journal*, indicates briefly some of the results of the war upon the British foundry industry.

The incidence of a year of wartime activities on the foundry industry has been profound, but evolutionary. The course taken is much as was to be expected and has resulted in record outputs by the steel-foundry section, the heavy iron-castings foundries and the nonferrous shops. Only in the light castings trade has slackness been experienced, but here again the effect has been anything but uniform. Though this is by no means a "cast-iron" war, important contracts are entered into for cast-iron munitions of war of a light character.

Most of the technical societies have arranged full programs for the Autumn and Spring, and a lead in this direction is being given by the Institute of British Foundrymen, for again the majority of its branches will be as active as usual. The early discomforts occasioned by the blacking out of foundries are gradually being overcome by the installation of light traps and improved ventilating systems. A wartime organization, the Ironfounders' National confederation, has made such progress that it is now the largest in the industry, and at the moment it can be regarded as the co-operative selling organization for iron castings.

"All-American" Performance

Another touchdown! What a Man!! He's a triple threat player with plenty of speed, stamina, versatility to win ball games. And those same desirable qualities are inherent in the new—



Milwaukee Jolt Squeeze Pin Stripper

Let one of these dependable machines "carry the ball" for you. It will enable you to put those troublesome short run jobs on a real production basis, with the simplest and most inexpensive pattern equipment.

SPEED Faster performance is assured because of the efficient Milwaukee design—fewer working parts—fewer motions required—valves carefully sized and located.

STAMINA Built to "take it"—with extra long jolt and squeeze pistons—steel and high tensile iron for wearability—squeezing pressure exerted against machined pads instead of hinge pin—hardened and ground guide pins and bushings.

VERSATILITY Offers extreme flexibility for a wide range of flask and pattern sizes. Adjustable lifting pins are accessible for quick setting. Squeeze platen height is adjustable in 1/8" increments.

MILWAUKEE FOUNDRY EQUIPMENT CO.

3238 WEST PIERCE STREET • Cable Address "MILMOLDCO" • MILWAUKEE, WISCONSIN

GATING CASTINGS IS IMPORTANT

(*Continued from page* 41)

ladle which breaks the stream into several units. Another reason might be that the metal being poured was skimmed improperly and scum was carried in during the pouring. Therefore, pouring should be made as foolproof as possible by the provision of a sprue mouth or pouring basin at the mouth of the sprue that will permit pouring by the most inexperienced. This can be done by making a well formed pouring basin at the top of the sprue so arranged that it can be flooded. This insures that pouring really starts from the bottom, the best of the metal entering the mold and leaving the scummy surface on top. The pouring basin of course, must be kept full during the entire process of pouring.

Place at Sprue Base

At the base of the sprue where it joins the main gate to the casting, a firm, well formed pocket should be made as shown in Fig. 2 so that as the metal falls through the sprue to this base, mechanical erosion will not occur. In almost all nonferrous metals, it is well to lead from the base of the sprue into a blind end or pocket, as illustrated in Fig. 1, at *D* in Fig. 3 and Fig. 5. The blind pocket will be filled with the first metal to come down the sprue, which frequently is such as to be undesirable to have reach the mold cavity itself and also will serve as a cushion to compensate variations in force of pouring. It might be pointed out in reference to Fig. 5 that due to the tendency of particles of dirt, dross, etc. to stick to the edges of the side gates, it is preferable to place the sprue and blind end as indicated by the dotted lines rather than the usual arrangement depicted by the solid lines.

The ingate may or may not lead through a skim gate. Many foundrymen have a great deal of faith in skim gates and there are good reasons for the use of skim gates in the production of castings from certain of the nonferrous alloys. Skim gates will be discussed in detail later.

After passing through the skim gate, if such a part of the gating system, the gate or leader should be of such a size as to accommodate an ample supply of metal to fill the molds at a satisfactory speed that will avoid any development of cold shuts. If the casting is such that it requires more than one entrance into the casting cavity from the gate, the entrances should be arranged to control the flow of metal so that the two streams will unite without forming cold shuts, or without undue agitation that would form scum or scum spots.

In some of the nonferrous metals it is desirable to have the gates of ample size to insure extremely rapid filling of the cavity to avoid scum spots. That is particularly true in the case of the yellow brasses in which there is no aluminum to form the usual oxide envelope. Hence the size of riser and gate is a matter of great importance and worthy of careful study. Likewise the shape needs study since it tends to break up the inflowing stream into globules that later must reunite into a single mass if a homogeneous casting is to be produced.

Many foundrymen make the mistake of providing a flow to a horn gate that is sufficient to cause a spurting of the metal as it comes out of the small end of the horn. Flow of metal into the horn should be controlled by the size of the runner or branch leading the metal to the horn. The size of that gate should be slightly less than the size of the opening out of the horn gate into the mold cavity, thus restricting the flow sufficiently to eliminate squirting. A quiet entrance of the metal into the mold cavity thus is insured. Here again it will be seen that the size of the gates or leaders, runners and sprues, must be studied carefully if best results are to be obtained and a uniform product assured. Once the right size of gate, sprue and runner has been established, it is well to set these up for permanent use for a given series of patterns so that there is no need for further experiment should duplicate orders occur.

There are many types of gating known as skim gates, and a few are illustrated as *A*, *B*, *C*, and *D* in Fig. 3. To be most effective, such skim gates must be used with the proper understanding of their theoretical functioning and with due consideration of the fact that none is one hundred per cent perfect, or entirely effective in removing scum or dross as the metal enters the mold.

In the first place some scum or dross may be formed after the metal has passed through the skim gate. It is not an infrequent thing to have dross form in the mold cavity itself. This is particularly true where the gates have been formed so that a nozzle effect is produced resulting in turbulence and mixing of air and metal within the casting cavity. Such action causes development of scum that is bound to be entangled in the metal and result in surface defects.

Many Skim Gates

Furthermore, some skim gates depend upon the use of dry sand cores as indicated at *A* and *D* in Fig. 3. The bond of the dry sand core may be burned down gradually as the metal flows through the gate loosening some of the sand. The sand is washed along the runner and may even pass on into the casting cavity. Some skim gates depend for their effectiveness on their restriction in the flow that is compensated by a skimming riser as shown at *B* and *C* in Fig. 3.

Theoretically, the scum removed from the metal has to pass up into this skimming riser, but due to the irregularity of pouring, the metal level in the riser goes up and down. Consequently, the scum may almost reach the top of the riser, but as the flow is decreased, the level falls off and some of the entangled scum goes down in the skimming riser and is carried into the mold cavity. Therefore, it will be apparent that even with skimming gates, good pouring is essential to best results.

In some of the skim gates used the principle is simply one of straining the metal, which in the author's opinion has a doubtful value. For after all, effective straining depends upon difference in size, the larger of two sizes being held back by the strainer and the smaller passing through the mesh. In the case of the molten metal, there is little or no difference in size of globules, since they may change in shape and size so as to be forced through the strainer. In doing so the globules may be entangled with the very scum that the strainer is supposed to remove.

When this scum is entangled with the globules of metal, it may pass through the strainer or may be sufficiently solidified to be held

(*Concluded on page* 92)

American Gloves

...for every type of job

American Safety Gloves and Mittens are made in all styles . . . in the finest qualities of asbestos and chrome-tanned leather . . . double-stitched and reinforced at all vital points. Inner seams are ironed smooth and flat, to prevent irritation and provide lasting comfort. New line of welding gloves is made on gun-cut pattern, with no seams in palm. Also hand-pads and finger-cots. No matter what kind of hand-protection *your* workers need, you will find it pays to:

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American Optical Company

Factories Located at Southbridge, Massachusetts

MANUFACTURERS, FOR MORE THAN 100 YEARS, OF PRODUCTS TO AID AND PROTECT VISION

(*Concluded from page* 90)

back by the strainers. The fact that some of the material is retained by the straining process is likely to mislead the user of this type of gate to assume that a complete job of straining is done, and therefore, defects visible in the casting must be explained by some other cause than that of having the scum carried into the molds in the gate. Obviously, had the strainer done a perfect job, no scum would have been carried into the mold and any that might be visible could be explained only by agitation of the metal after it had entered the mold cavity. However, the fact is that the strainer did not do a perfect job and the scum formed in the riser, from agitation produced by the strainer or from the ladle, actually was carried through the strainer attached to globules of clean metal. Therefore, the straining type of skim gate is only a partial cure for cleaning scum from the metal so that none of it is carried into the mold cavity.

Skimming Edge in Gate

A type of skim gate that frequently is assumed to be effective in the production of some castings depends upon the passage of the upper surface of the metal as it travels through the gate against a sharp skimming edge formed in the gate. However, in some cases no provision is made for a storage space in which the scum can be held as it is skimmed from the metal. Also it is not an infrequent experience to find that even if storage space is provided, it is filled immediately with metal, and therefore, is not available to store the skimmings.

It will be seen that skim gates cannot be 100 per cent effective in removing the scum from the metal as it enters the mold cavity. While they may be partially effective in removing some of the surface film from the moving stream, the surest method of having clean metal in the mold is to have the right size sprue and keep it full to the top at all times to insure the floating scum remaining on the top of the sprue.

An adequate pouring basin on the top of the sprue permits a body of fluid metal at this point, with clear, clean metal in the bottom flowing down the sprue and the drossy film floating on the top. Size of the gate and of the pouring sprue must be correct to insure the continuous and free flow of an adequate supply of clean metal to all mold cavities attached to the gates.

However, the size of the gates should not be so large that the flow down the sprue is rapid enough to suck with it the floating scum, or in an extreme case, suck air as well as the scum. If such a large amount of metal is necessary for the mold as will cause a heavy rush of metal down through the sprue, then it is better practice to have two or more sprues. Each sprue should be the right size to keep the scum floating quietly at the top and yet let an adequate supply of metal pass into the mold without too much force, rush and suction.

Plan N.F.A. Meeting In New York

Annual covention of the National Founders' association will be held at the Waldorf Astoria hotel, New York, Wednesday and Thursday, Nov. 13 and 14. Sessions will be held on both days, with a meeting of the administrative council on Tuesday, Nov. 12, and the annual meeting of past and present officers on that evening. An interesting program dealing with various phases of management problems is being prepared for the convention.

Cast Cylinder Heads For Aircraft

(*Concluded from page* 49)

and aluminum castings are made in the main foundry at Paterson. Aluminum castings include various sections of the crankcase, oil pump and several housings. At one time all pistons for the Whirlwind and Cyclone engines were cast by the Wright company, but aluminum alloy forgings now are used for these parts. Bronze castings are employed only for crankcase counter weights in certain types of airplane engines.

This latest development in foundry practice is in keeping with the tradition of the company and represents the culmination of nearly a quarter of a century experience in the production of aluminum alloys castings for aircraft engines. Claim is advanced that it is the only aircraft engine building company in America that maintains and operates its own nonferrous foundries.

Bulletin Available

Iowa Engineering Experiment station, Iowa State college, Ames, Iowa, recently has made available a 128-page bulletin describing an investigation to determine a reliable and convenient method of structural design of any line of cast iron pipe subjected to both internal and external pressure. The bulletin is entitled, "Supporting Strengths of Cast Iron Pipe for Water and Gas Service," by W. J. Schlick.

Adventures of Bill

(*Concluded from page* 66)

tons. The first one burst out of the mold and flooded the pit. The shop caught fire over the second one and wood piling or cribbing created such an intense heat that a large piece cracked and fell out of one side of the bell. The whole thing was set up on a pedestal in a Moscow public square and was one of the sights of the place in the good old days. Incidentally an English foundryman was in charge of the foundry when the first bell was cast. His son followed him and cast the second one.

5—Several instances are on record of men falling into baths of iron or steel. The piece of metal always has been buried with suitable ceremonies. A scene of this kind was included in a picture, "Men of Steel," presented several years ago with the late Milton Sills as the hero. The picture had several technical mistakes. For example it showed a locomotive crane carrying the ladle of solid steel into which the villain—the dirty dog—had fallen. The idea was all right, but unless I am a Chinaman, the ladle was a 75 ton capacity ladle, and the crane had a lifting capacity of 10 to 15 tons, depending on the position of the boom.

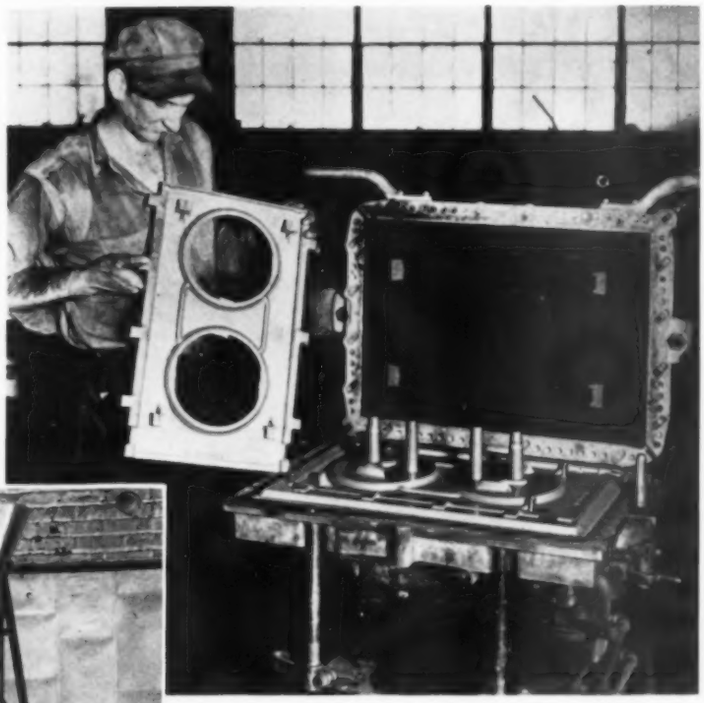
For your record the largest casting ever poured—except the Russian anvil—was a steel platen for a hydraulic press, made for its own use by the Bethlehem Steel Co. Weight of cleaned casting 240 tons, weight of rough casting with gates and risers 290 tons. This job was described and illustrated in the Sept. 1, 1931 issue of THE FOUNDRY. Quite a job manipulating the six open hearth furnaces and the seven ladles.

Study Production

American Management association will mold a production conference at the Hotel Cleveland, Cleveland, Nov. 12 and 13. The program will include a symposium on multiple shift operation and sessions devoted to "Key Production Problems in the Present Emergency," "Man Power Problems," "Production Man and the Government in Defense Production," and "Meeting Increased Production Needs with Better Foremanship."

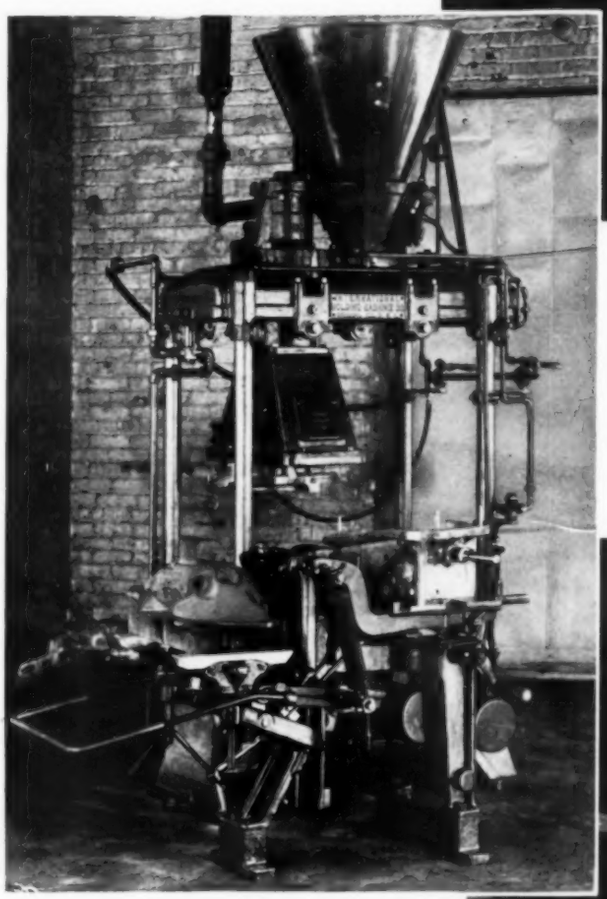
Copper Development association recently removed its offices from Thames House, to Grand Builds, Trafalgar Square, London, W. C. 2. The association is a noncommercial organization maintained by the British copper industry. G. W. Preston is general manager.

INTERNATIONAL
Molding Machines
are built in
70 Standard designs
900 different sizes
also
a vast variety of Special
Designs for work
of unusual character

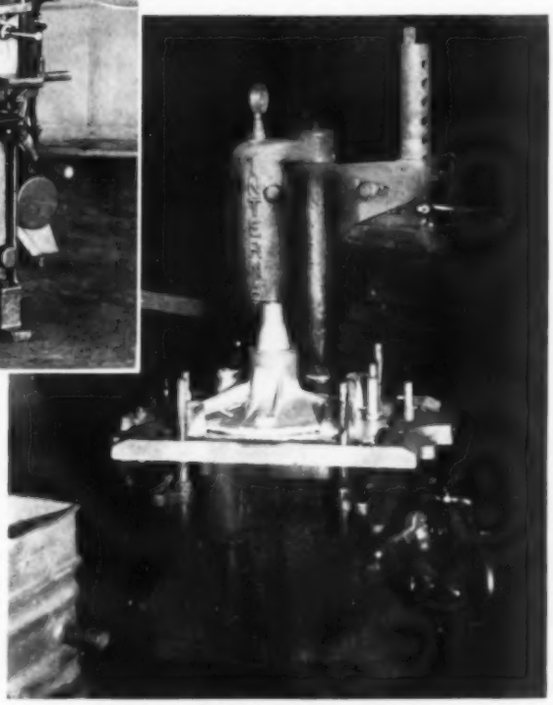


Type JDP
Jolt ram Power lift machine

HIGH PRODUCTION schedules
can be continuously maintained
by using
INTERNATIONALS



Type SB 13 Core Blower
and Type R machine, for
clamping, turning over
and drawing.



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SHOWS STEADY GROWTH

(*Continued from page* 37)

up an incline to the open-hearth charging floor. Charges are converted into steel in two oil fired open-hearth furnaces, one of a rated capacity of 30 and the other of 50 tons. These capacities, as in practically all steel plants, frequently are exceeded. It is not uncommon to tap a heat of 35 tons out of the smaller furnace and a heat of 55 tons out of the larger unit.

Sometimes, as an added precaution in securing homogenous metal, the steel is tapped into one ladle then transferred to a second ladle which is used for pouring the metal into the molds. The furnaces are located at the extreme northwest corner of the foundry building with the tapping spouts opening into the main bay.

Many Activities in Main Bay

All molding, pouring and shakeout activities are conducted in a long, straight section of the foundry building, 79 x 780 feet 5 inches. Center to center distance between crane runway rails is 75 feet. Commencing at the north end and moving toward the opposite end of the building the floor space is occupied by a molding unit devoted to the production of steel bolsters for railroad cars; two large pits in which molds for steel rolls are set up for pouring; closing floor for green and dry sand molds for miscellaneous steel castings; pit for setting up molds for iron rolls; iron roll molding floor and four large underfeed stoker coal fired mold drying ovens; shakeout area; sand preparation and four bell type heat treating furnaces; final section 122 feet in length and extended in width by an addition of 41 feet, 7-inch leanto, in which sand molds for rolls and other large castings are made under a sandslinger, made by the Beardsley & Piper Co., Chicago.

Molds for light and medium weight steel castings are made on jolt rollover machines supplied by the Herman Pneumatic Machine Co., Pittsburgh. The machines are set up in pairs, one pair at the north end; one pair at the west side of the closing floor; and a third pair opposite the shakeout area. Sand for these molding units is supplied from overhead hoppers, and belt conveyor system. The bolster production unit at the north end of the building takes all the sand from a muller type mixer made by the National Engineering Co., Chicago. Sand for the other molding stations, facing and backing sand, is prepared in a muller, built by Beardsley & Piper.

New sand, grain fineness 50 to 55, comes from the Ottawa, Ill., district. For green sand and skin dried molds the facing mixture is made up of approximately 75 per cent old sand, 25 per cent new sand with varying amounts of cereal binder and bentonite, depending on the character of the molds. For dry sand facing the proportions of old and new sand are reversed, 75 per cent new sand and 25 per cent old sand. The batch of 1500 pounds also contains 200 pounds silica flour, 40 pounds fire clay, 12 pounds bentonite and 3 quarts molasses. Green sand permeability ranges from 175 to 225, green strength from 4.5 to 5.5 pounds, and moisture from 1.5 to 3.5 per cent. Permeability of dry sand facing lies between 30 and 50, green strength from 6 to 7 and moisture 5 to 6 per cent. In the backing sand the permeability varies from 130 to 200, green strength from 3.5 to 5.00 and moisture from 2.5 to 3.5 per cent.

Sand for the core room 78 x 174 feet is made up according to several standard and special formulas. The mixtures are prepared in a revolving pan mill of the type once employed extensively in all steel foundries. In this instance the original device has been improved to a considerable extent through the inventive genius of the veteran core room superintendent. Incidentally, practically every department has a number of competent and highly skilled veterans familiar through years of practical experience with the myriad details involved in the successful production of steel castings. The management takes a legitimate pride in the esprit de corps and long service record of many employes.

Increases Mixer Capacity

Efficiency of the core sand mixer first was improved by the addition of a skip loader. This idea of course does not rate a citation for originality since the device is in common use on blast furnaces and in many sections of the industrial field. The second addition truly is worthy of comment. So far as the present writer is aware, it is the only one of the kind in existence. A concrete mixer barrel is mounted above the revolving pan. The skip hoist delivers the batch of sand and binder to the barrel where it receives a preliminary dry mixing and then is discharged into the pan for the final operation. It is claimed that the combination not only improves the mixture, but increases the delivery capacity of the mixer by approximately 50 per cent.

Typical mixture for light cores contains 720 pounds new sand, 7½ pounds cereal binder and 2 quarts oil. Cores for medium weight castings contain the same amount of new sand, 16 pounds cereal binder, 35 pounds silica flour, 2 quarts oil. The core mixture for heavy duty cores, exposed to high temperature and pressure for a considerable period, contains 540 pounds new sand, 100 pounds silica flour, 28 pounds fire clay, 3 quarts oil and 1 quart molasses. Black core facing, outside and covering cores, pouring cups, etc., contains 1080 pounds old sand, ½ pound cereal binder, 7 pounds pitch compound, 1 quart molasses. Sand for green topping and backing is made up of 360 pounds new sand, 360 pounds old sand, 5 pounds cereal binder, 1½ pounds resin. The core room under a common roof and without any partition walls, lies outside the west wall of the foundry and about midway from either end of the building. Immediately adjacent are four large car type core and mold drying ovens stoker fired with coal.

Practice Sand Control

Condition of the sand is not left to chance, to casual examination, to rule of thumb or feel test. The fallible human element practically has been eliminated in this highly important phase of foundry technique. A sand expert devotes all his time to supervising sand preparation methods. Samples are tested and inspected constantly in a special laboratory equipped with modern devices through which standards are maintained according to A.F.A. classification.

Iron rolls are molded and cast in the orthodox manner. The upper and lower necks and lower wabbler are molded in sand in circular iron flasks. The remainder of the mold is made up of circular iron chills assembled in various lengths according to the length of the desired casting. The wabbler is omitted from the upper end and the enlarged neck is projected for lengths varying from 1 to 2 feet in which the metal serves as a sink head and feeder while the metal in the casting is shrinking and solidifying. Metal is poured into the mold through a long sand lined casing outside the chills. The casing is surmounted by a large, rectangular, tapered, sand lined pouring basin, and is attached by clamps to an opening in the side of the lower neck flask. Metal from the upright runner enters the mold through a horizontal gate set at a tangent to impart a whirling motion to the metal as it rises in the mold.

The mildly centrifugal action serves a double purpose. Any scum or other foreign inclusion remains in the center and is carried upward to the sinkhead. Constant movement of the metal prevents any momentary pauses which might produce

(*Concluded on page* 96)

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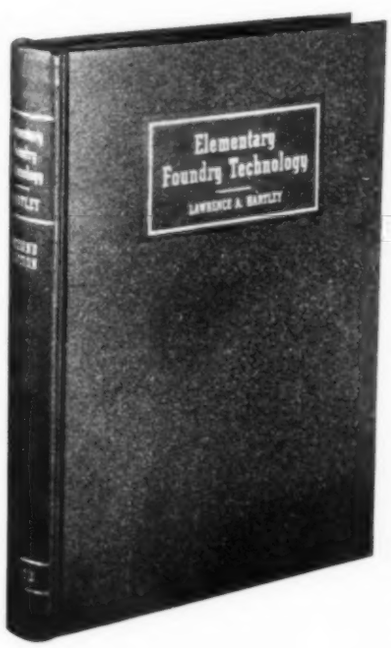

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"Elementary Foundry Technology", by L. A. Hartley; Second Edition revised by Edwin Bremer and Pat Dwyer; 377 pages; 6 x 9 inches; 132 illustrations, 16 tables; includes glossary, index and bibliography; sponsored by the National Founders Association Chicago; Price $3.00, postpaid; Published by The Penton Publishing Co., Clevelan

(*Concluded from page* 94)

waves or wrinkles on the surface in contact with the chill.

Grain rolls, in which the necessary physical properties are secured through the use of alloys, nickel, chromium and molybdenum, and subsequent heat treatment, also steel rolls in which the grooves or passes are molded in the approximately desired shape, are molded in sand according to a somewhat different technique. A two part flask is employed and the mold is made and dried in a horizontal position. Later the two halves are assembled and the complete mold is up ended and lowered into a pit for convenience in pouring the molten metal.

Sand is rammed in the half flask to a rough approximation of the desired shape. Temporary wood frames equipped with suitable bearings are bolted to each end of the flask. A long steel spindle mounted on the bearings carries a board with the outer edge conforming to the desired shape of the roll. By revolving the spindle and board the superfluous sand gradually is cut down and removed. The surface is finished by hand, nailed where necessary and then covered with a coating of silica wash before the mold is loaded onto one of the large cars which carry it into a drying pan.

Production of rolls, always regarded as one of the closest and most exacting branches of foundry practice, has grown even more exacting in recent years. Minute specifications covering composition and physical properties are presented by the customers. Alloys are used extensively in the mixtures and various types of heat treatment are required to develop maximum desirable properties. Obviously, in addition to a high degree of practical skill and knowledge on the part of the operators, scientific control and supervision are constantly involved. Facilities for this work are provided in a well equipped chemical and physical laboratory located close to the foundry.

The casting cleaning room 53 x 604 feet, also 53 x 250 feet adjoins the foundry on the east. In addition to all the usual appliances, it is equipped at one end with five car type heat treating furnaces, four fired with gas and one fired with oil. Four bell type heat treating furnaces, 10 x 26 feet are located in the foundry. The castings are placed on the floor and the entire upper structure of the oven, walls and roof is lifted on or off for the entrance or removal of the load. All heat treating furnaces are controlled automatically by Leeds-Northrup recorders and controllers. The furnaces are all lined with light weight heat resisting insulating bricks.

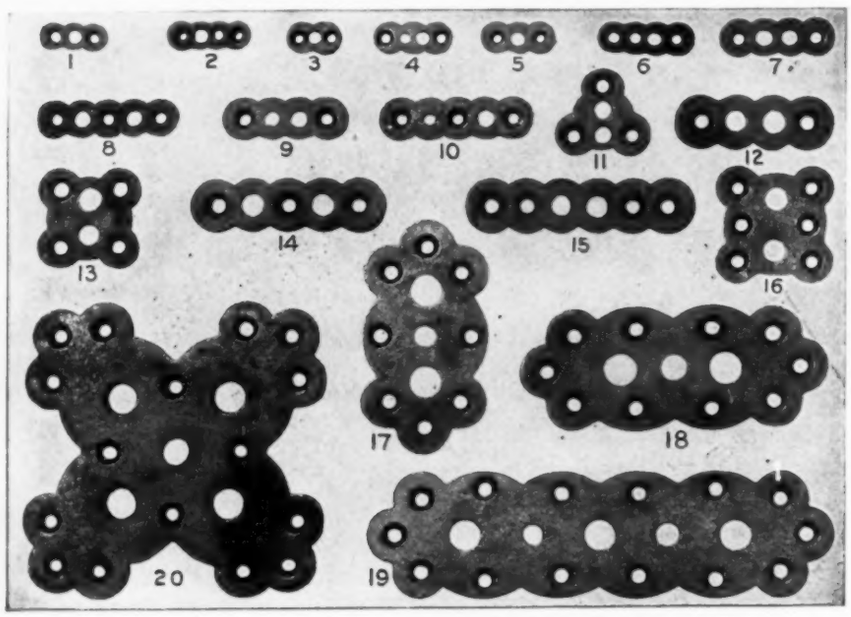
This is the first of two articles dealing with activities at the plants of the Ohio Steel Foundry Co. The present article is confined to the open hearth plant in Lima, O. The second article, to appear in an early issue of THE FOUNDRY, will take up some interesting features in connection with the production of alloy steel castings at the company's electric furnace plant in Springfield, O.

THE EDITORS.

Shows Earnings of Foundry Employes

During the latter part of 1938 and the early months of 1939, hourly earnings of all male workers in gray iron foundries averaged 67.1 cents, according to a report made to the secretary of labor recently by Commissioner Lubin of the bureau of labor statistics. Weekly hours averaged 35.0, and the average weekly earnings amounted to $23.44. Male workers in malleable iron foundries had average hourly earnings of 68.9 cents and average weekly hours and earnings of 35.4 and $24.37 respectively.

The wage structure in gray iron foundries, according to the report, is influenced by a number of factors. One factor that must be considered in comparing wages in this industry with those in other industries, is the predominance of men. Virtually the entire labor force, 99.7 per cent, consists of males. Of these males,



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about 39 per cent were classed as skilled, 24 per cent as semiskilled, and 37 per cent as unskilled. There is also a heavy concentration of gray iron foundries in the high-wage industrial areas.

Of the 36,749 male workers in gray iron foundries covered by the report, only 7.7 per cent had hourly earnings of less than 40 cents, and 26.8 per cent of the total earned less than 52.5 cents an hour. By contrast, there was a fairly substantial number of employes in the higher brackets, 23.9 per cent earning 82.5 cents or better and 9.5 per cent with earnings of $1 or more an hour.

In gray iron foundries, as in many other branches of productive activity, there are pronounced geographical differences in hourly earnings. Against an average of 80.4 cents for all gray iron foundry employes in Washington, those in Florida, Georgia and South Carolina averaged 41.8 cents. In any geographical comparison in this industry, however, the factor of color should be considered. In the northern states, colored workers are found in all of the skill classifications, while in the south, the colored workers are confined almost entirely to the unskilled group.

Hourly earnings in gray iron foundries are dependent, to a large extent, on the specific occupations of the individual employes. The skilled occupations, with but few exceptions, had average hourly earnings ranging between 80 and 90 cents. These occupations were made up of such skilled craftsmen as molders, pattern makers, core makers, etc. Most of the semiskilled occupations had average hourly earnings of between 53.9 (the average for apprentices) and 65 cents. Among the unskilled jobs, consisting mostly of various types of foundry labor, the range was from 41.8 cents for watchmen to 60.3 cents for core oven-tenders.

Of the few females employed in gray iron foundries, the great majority held semiskilled jobs. The average hourly earnings of all females was 58.3 cents. Their weekly earnings amounted to $18.69 for an average workweek of 32.1 hours.

In malleable iron as in gray iron foundries, the labor force was made up almost entirely of men. Of these males, 35.8 per cent were skilled, 25.9 per cent semiskilled, and 38.3 per cent were classed as unskilled. A feature of the wage structure in malleable iron foundries is the small proportion of workers in the low-wage brackets. Of the 6157 males covered, only 0.7 per cent had earnings of less than 40 cents an hour. By contrast, 4.9 per cent had hourly earnings of $1 or more. Two-thirds (65.1 per cent) of all male workers had hourly earnings concentrated within the comparatively narrow range of 52.5 and under 82.5 cents.

Skilled workers had average hourly earnings of 80.4 cents, with most of the occupational averages coming within the narrow range of 75 to 85 cents an hour. Semiskilled workers in malleable iron foundries averaged 65.7 cents an hour and the unskilled workers had an hourly average of 60.5 cents.

Of the few females employed, about two-thirds were in semiskilled jobs and the remainder were unskilled. The average hourly earnings of all females was 55.6 cents. Their average workweek was 33.4 hours, with average weekly earnings of $18.55.

To Acquire Firm

Westinghouse Electric & Mfg. Co. will acquire the American Air Filter Co., Louisville, Ky., for approximately $5,000,000, and will continue to operate the organization as the American Air Filter Co., division with no change in personnel or management.

American Air Filter Co. was organized in 1916 by William M. Reed, now president of the organization, under the name of the Reed Air Filter Co. A merger with the Midwest Air Filter Co. of Bradford, Pa., in 1929 resulted in the formation of American Air Filter Co.

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PROGRESS IN MELTING GRAY IRON

(*Continued from page 45*)

capital expense. A modification of analysis, an improvement in temperature, or a desire for a metal reservoir supply between melting and pouring floor may cause a foundry to switch to a duplex process of producing molten metal.

In some areas the ideal melter uses an air furnace (roll furnace) or reverberatory type of furnace. Raw materials are bulky and heavy and are not suitable for charging into any other furnace. The second largest tonnage of gray iron is melted in that type of furnace. Gray iron may be melted in crucible, air furnace, roll furnace, rotary furnace, open hearth furnace, electric furnace, cupola and various combinations of these furnaces. The cupola is the most important, but the ideal melter does not believe that any one type of furnace is paramount for producing a quality product. He accurately weighs everything that goes through the charging door of the cupola and makes a heroic attempt to do the same with the air supply. Not many years ago the weight of the cupola iron charge was on the high side and it consisted of just two components, pig iron and cast iron scrap. The function of weighing mainly was to determine when 10, 20, 50 or 100 tons had been charged into the cupola. Weighing errors of 40 or even 100 pounds on a 4000 pound iron charge were relatively unimportant. Weighing was more a matter of keeping monthly or annual inventories in good order than for metallurgical control. Today in the same cupola, the iron charge is more likely to be 2000 pounds than 4000 pounds and the number of components in the charge is more likely to be 6 or 8 and even up to 12 instead of 2. Errors in weighing have a very definite bearing on metallurgical control and the function of weighing has changed from one of inventory control to metallurgical control. Errors of 50 to 100 pounds, when weighing 4000-pound, two component charges, are not permissible with 2000-pound six or eight component charges.

Errors Made in Weighing

A recent experience illustrates the point. Supervising the operation of a small cupola involving 500-pound charges made up with five or six components and 72-pound coke charges, the matter of accurate weighing was discussed with the yard foreman and assurance was given that weighing would be of unquestionable accuracy. The heat did not start off well and became progressively worse. Apparently everything had been done as requested. A thorough check-up showed that some of the coke charges weighed only half as much as the amount planned and all of them were underweight. Another illustration is from a foundry that recently made a heat of special iron, which when analyzed showed that the goal was missed by almost 50 per cent. Tracked down it was found to be due solely to a weighing error.

Weighing is a simple matter and receives little attention from most foundrymen but the ideal melter is thankful for a modern development—an automatic device that records the weight of each charge component and enables the foundry management to check the accuracy in weighing all charge components of all charges and make corrections in men or equipment if errors occur. The ideal melter weighs his intermediate coke charges. Long ago he abandoned the idea that so many forksful meant so many pounds or close to it. He knows that some

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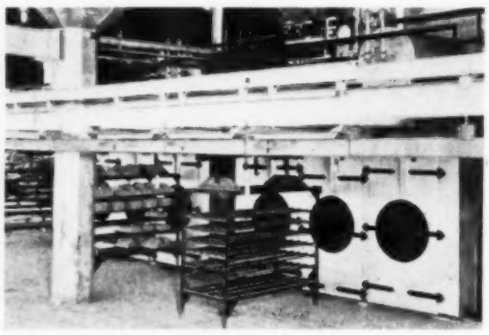

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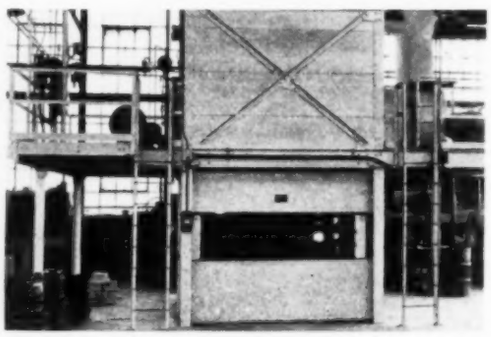
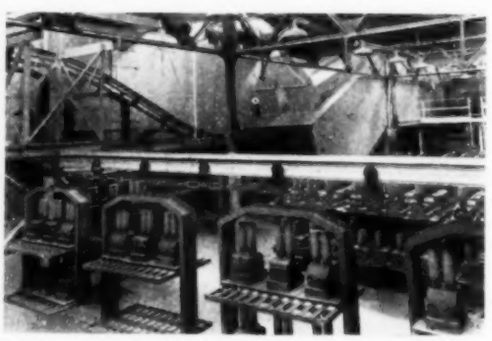


Vertical Core Oven



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of the coke carbon is dissolved by metal in the melting process and that he must consider coke as part of the iron charge as well as being the heating medium.

He is not completely satisfied to weigh only that which goes into the cupola. Weighing the molten metal assures him that ladle additions will be made to the right amount of metal. He knows that metal returned from the pouring floor is undesirable and knowing how much the floor needs he weighs it and sends that amount. He realizes that some provision should be made for loss of metal due to a run out or to a deficiency in estimating the amount of metal required to fill a mold. He makes provision for these contingencies in a controlled development rather than a hit or miss system that only uses from 66 to 75 per cent of the metal sent to the pouring floor.

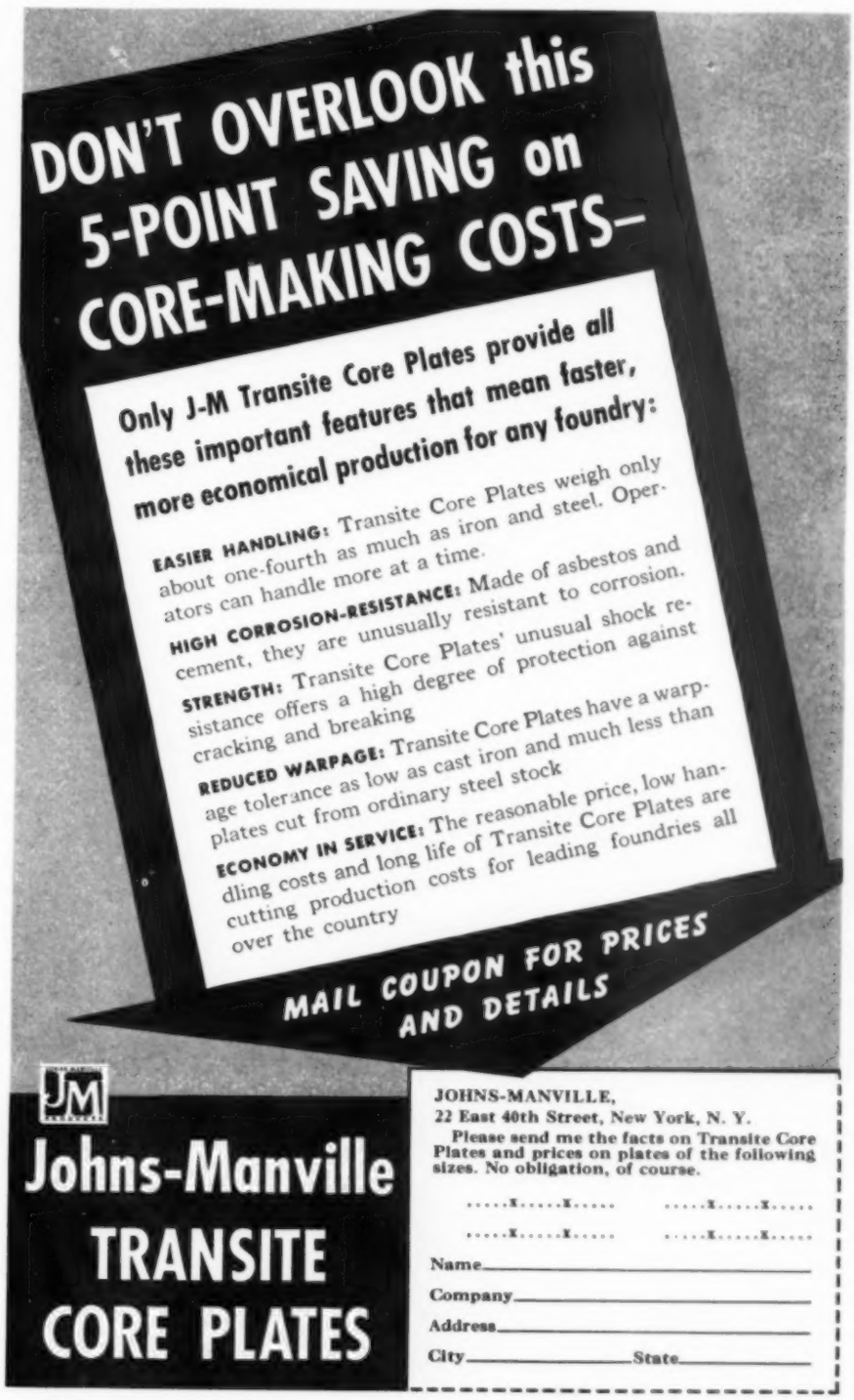
The ideal melter has definite ideas on what is suitable to include in his cupola charge. He has abandoned the old type pig weighing 80 to 100 pounds for the 40-pound pig. He prays for the day when he will be able to buy a pig only a third or half as long as the present pig. Operating a cupola as small as 24 inches, inside diameter, or even as small as 14 inches inside diameter, he sometimes finds it necessary to break small pigs into 3 or 4 pieces.

He avoids buying just a "good grade of foundry coke" and asks for a definite size in screened coke of a type most suited to his type of iron whether it be a low total carbon iron or a high total carbon iron. He uses a coke sized to about one-twelfth of the cupola diameter and attempts to keep the length of materials in his iron charge down to 30 per cent of the cupola diameter. He knows that he could use almost 100 per cent briquetted cast iron borings in his cupola charge if he knew the complete composition of the borings and factors bearing on contamination, storage, etc. provided, of course, their composition tied in with the iron he wished to produce. He has used a cemented briquet made up of 18 pounds of cast iron borings with 2 pounds of cement, 10 per cent briquets in the cupola charge for textile machinery castings.

He has even pushed the salvage operations of his cupola to the use of non-briquetted heavy steel turnings. One midwest foundryman used over 100 tons of steel turnings in his cupola during 1939 and anticipates using 200 to 300 tons during 1940. Both of these illustrations are from plants operating their own machine shops. Composition and condition of their salvage materials are fully known. Another foundry in the vicinity uses 60 per cent briquetted borings in the cupola charge. In a foundry where better than 90 per cent of the charge consisted of coiled wire rope, the rope was coiled in units weighing 100 to 200 pounds and coils were not quartered or halved before charging. Foundry melting operations continue in the direction of salvaging much of the waste and scrap ferrous materials produced by industry. Apparently the cupola melter is meeting his salvage problems and doing more than is done in other types of furnaces.

The cupola melter is using the new methods developed to analyze iron rapidly for control purposes. These include the spectrograph, electrical and chemical methods for rapid determinations of elements. He acknowledges these facilities as a means of continually improving the quality of his product. It may seem somewhat far fetched to refer to analytical methods in a discussion on developments in melting, but it seems quite obvious that these developments are definite aids to the melter.

The ideal melter has divorced his metallurgical thinking from the binary iron-carbon system to the ternary iron-carbon-silicon system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and now thinks of gray iron in terms of carbon and silicon content rather than only the silicon content. He thinks of carbon as not only important in terms of the total amount present but of the control of carbon above and below the desired amount. Regardless of whether he is producing low, intermediate or high carbon irons, he knows that he must have a suitable fuel, then control the amount of fuel used and finally consider the importance of his tapping method on carbon control. If he is tapping and botting intermittently he times the sequence, generally in the range of 10 to 40 taps an hour or from 6 to 1½ minutes per tap. To ignore the importance of tapping sequence is to ignore an important reason for carbon variation in gray cast iron and consequently a variation in quality, density, etc. In this method of tapping the time between taps has varied from 1 to 20 minutes or more.

In many foundries the time between some taps has been 3 or 4 times longer than the time on other taps. The reason for this practice is the generally accepted belief that metal stays hotter in the cupola than in the ladle when large amounts of metal have to be accumulated. Actually the reverse is true. A hotter metal temperature is developed where the accumulation is made by frequent tapping.

The cupola tender plays an important part in attaining the desired metallurgy and quality in iron. Within one foundry melting one type of iron, variations in carbon may be as much as 90 or 100 points. The desired goal should be to hold the carbon spread as low as 10 points or at least keep within 15 points. To make frequent taps necessary, some melters lower the slag hole to decrease the storage capacity of the cupola. This practice is quite satisfactory where the size of the cupola charge, reservoir, ladle capacity or pouring ladle capacity are in harmony. For example, a large cupola melting 3000 or 4000-pound iron charges would not be in harmony if tapped directly into 700 or 800-pound monorail ladles, if the slag hole had been lowered to decrease well capacity and consequent mixing.

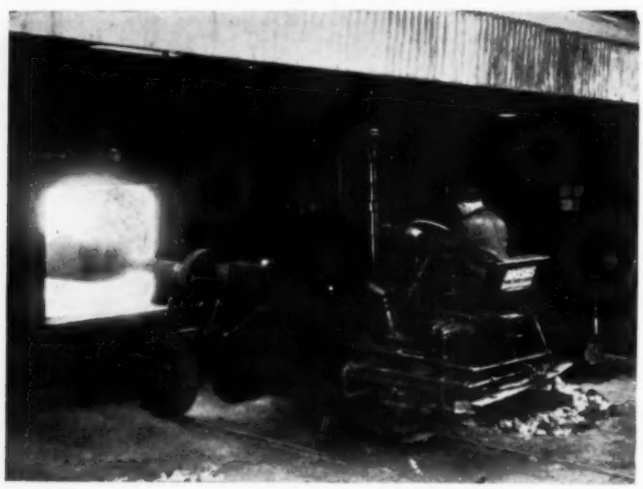
The front slagging spout may be classed as a new development, for though this type of spout found acceptance in the industry many years ago, it was not widely used until quite recently. This type of spout reduced the contact time between metal and fuel to the least possible.

Vary Weight of Charges

The ideal melter appreciates the flexibility of the cupola melting unit. In days gone by, a 4000-pound charge was a 4000-pound charge. If the foundry had a special casting weighing considerably less than a cupola charge, the problem was solved by either holding up production until additional similar molds were ready, or by running off a charge, pouring the job and pigging the remainder of the metal if no other job on the floor could take it.

The usual charge for a 72-inch inside diameter cupola has been 4000 pounds, in some cases 3000 pounds, but in others as high as 12,000 pounds. Excellent results may be attained with charges as small as 1000 pounds. A 36-inch cupola will do a good job with a charge as small as 250 pounds. Where a foundry has been using a 1000-pound charge in a 36-inch cupola and has a special job requiring 250, 300, 400 or more pounds of metal, the flexibility of the cupola melting unit probably will measure up to requirements.

An ideal melter is interested in the problems involved in the metal handling circuit and knows that some of the desired properties in the casting are dependent on the temperature at which metal is poured into molds, the time factors



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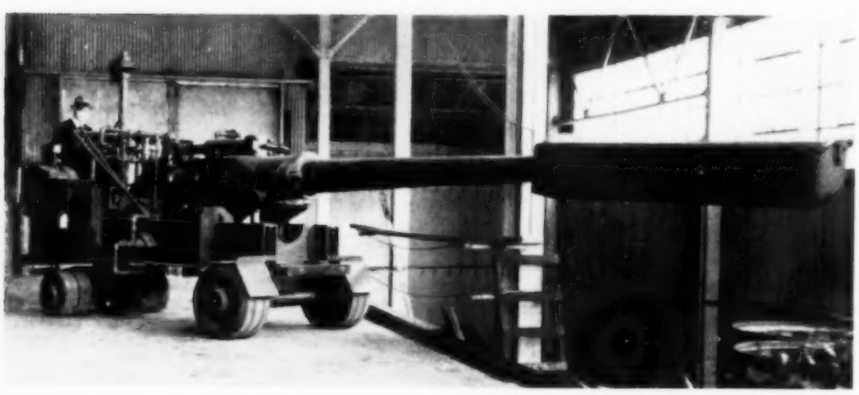

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in filling the mold and general mold conditions. Developments in this direction include pyrometer studies of metal at furnace and at pouring stations, increasing the speed or decreasing the time with which molds are poured, tying in fast pouring speeds with devices that tell when molds are filled, use of insulated and covered ladles, etc.

Cupola metal temperatures frequently are above 2800 degrees Fahr. and occasionally approach 2900 degrees Fahr. but this temperature may be related only mildly to the pouring temperature which may be as low as 2450 degrees Fahr. or even less. Temperature losses in handling metal even in a well equipped and well supervised circuit are seldom less than 200 degrees Fahr. and may exceed 500 degrees Fahr. The melter is concerned less with the theories of superheating than he is with expediting his metal handling circuit to get metal into molds at high temperatures. He is concerned mainly with pouring temperatures. Knowing the anticipated temperature losses in handling he establishes his melting temperature by adding the desired pouring temperature and temperature loss in handling.

As the pouring speed has been stepped up, devices have been developed to warn the pouring man when the mold is filled. A Denver foundryman has a wood float which he fits over a riser. When the metal lifts this float the pourer stops. Electrical devices on cylinder block molds close an electrical circuit to ring a gong or blow a horn. In large molds the warning is given when the flame at the riser disappears.

The ideal melter is highly interested in various methods for checking suitability of metal at the cupola. Chill tests, wedge tests, fluidity tests, etc. are obtained quickly and when properly handled show close correlation between metal at the cupola and in the fracture of the casting. These tests involve only minute quantities of metal, therefore gross errors in interpretation may be introduced if metal temperatures, pouring speeds, etc. vary. A fluidity test that can be poured with the ladle held at various heights above the gate involves a variation in ferrostatic pressure. Metal of equivalent fluidity will appear to be more fluid or less fluid as ferrostatic pressure increases or decreases. Where the chilled face of a chill test is in the vertical plane, the chilling capacity along the length of the bar will vary with varying pouring speeds. Unless the pouring speeds are uniform and unless all bars are broken at the same spot, the interpretations may be misleading. Whatever type of control test is used, the ideal melter recognizes the variables likely to be present and attempts to pour at uniform temperatures, at uniform pressures and fill test molds in fractions of a second.

Many panaceas are offered in tuyere design to promote a faster melting rate, save fuel or produce hotter iron. Change in tuyere design does not improve melting conditions unless accompanied by some change in operating details. A great many operating improvements have been made by changes in operating details which were not accompanied by a change in tuyere design.

Numerous ethical and bonafide materials to be used as ladle additions are offered to foundrymen today. Some also are offered that are not either ethical or bonafide. One of the latter seems to have been shale, the analysis of which included the assay value of contained silver and gold. There is no mystery in what these ladle additions are supposed to accomplish and there is no reason why they should not be evaluated at their true worth. If the material is supposed to make iron more fluid, check the fluidity. If it is supposed to improve the strength, check the strength. If it is supposed to eliminate dendritis, check the microstruc-

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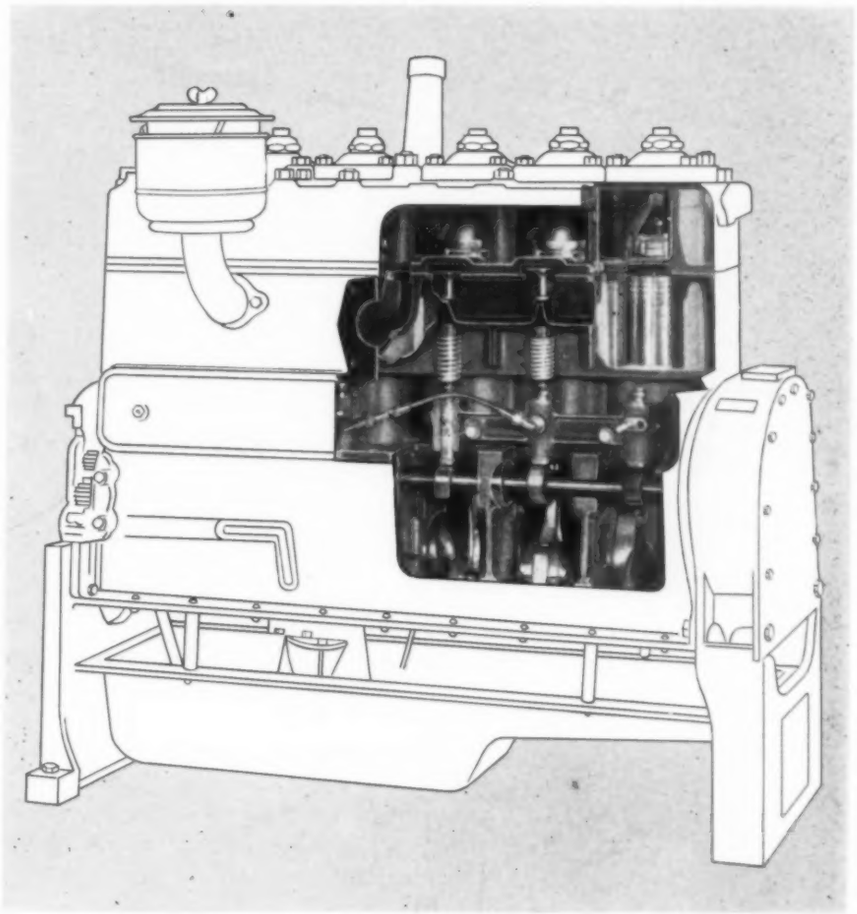

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ture, etc. Gray iron is in an era in which rapid improvements are being made in its physical properties and the demand for these better qualities are increasing. More panaceas probably will be offered in the future than in the past, so why not start now to evaluate what improvements, if any, have been made by their use.

The ideal melter has been interested in conditioned air for the cupola and has been keeping a cocked ear ready for news. At one time suitable equipment cost about $5 per cubic foot capacity, i.e., $30,000 for equipment that would handle 6000 cubic feet per minute. Equipment now is available at a much lower cost, about $1.50 per cubic foot capacity.

Foundrymen have used various expedients in an effort to compensate for varying moisture conditions in the cupola air supply. They have tried more fuel with increasing moisture or decreasing the amount of the steel in the charge with increasing moisture. The correct way to control one more of the variables of cupola practice is to eliminate the variations at the source, that is, condition the air supply. A foundry has installed, as described in THE FOUNDRY for September, page 38, an air conditioning system. We have one installed on an experimental cupola in our laboratory foundry. This is a standard industrial unit, using lithium chloride as the drying agent. Silica gel, activated alumina and other drying media are or may be used as well as mechanical refrigeration.

Preheating the blast has been marking time during the past two or three years, while the industry has had its attention focused on tuyere system. The system has merits and may blossom out some day as a full fledged member of the team of cupola accessories.

Flow Slag Into Water

Numerous methods are available for handling cupola slag, mainly involving flowing slag into water. Slags bring up the story of fire and water, as told by the insurance companies. They are man's best friends and worst enemies. Slag is a desirable adjunct of cupola operation but an awful bother to dispose of if no method is set up to handle it.

Many reported remarkable developments on melting equipment are illustrated in a recent instance. A foundryman wanted the best possible cupola design. He solicited assistance from others to supplement his own ideas. The result was a cupola that had all the latest wrinkles in tuyere design, homemade preheating equipment, etc. Many interesting stories of performance were in circulation. A personal inspection some time later showed that preheating had been discontinued because the preheater burned up. The tuyere arrangements had been simplified to conform fairly closely to that of any ordinary cupola.

From a paper presented at a regional foundry congress held at East Lansing, Mich., sponsored by the engineering department Michigan State College and the Detroit chapter A.F.A.

THE EDITORS

Acquires Firm

Whiting Corp., Harvey, Ill., has acquired the Quickwork Co., St. Marys, O. and Chicago, manufacturer of rotary shears, stamping trimmers, and forming machines, power hammers, throatless shears and flangers. That line of equipment will be continued by the Whiting plant in Harvey. Stevens H. Hammond, vice president, Whiting Corp., will be in charge of Quickwork operations, Paul V. Hyland, formerly of the industrial division of Whiting, has been appointed Quickwork sales manager, and B. W. Packer, formerly of the Quickwork Co. will be chief engineer. S. M. Steinko will be in charge of the advertising of the new line.

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DEVELOPMENTS IN CASTINGS

(*Continued from page* 44)

A number of factors are important—the major ones being the charge, the slag, the temperature of the steel, the order of additions, and their relative time of introduction. It may be stated without fear of contradiction that ferroalloys from any source do not introduce any detectable amount of gas if dry when added. The metallurgical reactions following their addition may, however, cause trouble and, when the ferroalloys are added in substantial percentages, their influence on the solubility in steel of gases must be recognized.

Usually, when porosity troubles develop, the melter fails to diagnose properly the origin of the gas, overdoes some part of the melting scheme in his eagerness to correct the condition and gets into greater difficulties.

Melting Practice Variables

A uniform *starting point* is recommended, as well as a definite scheme of deoxidation in finishing the heat. Any deviation from these conditions brings about a modification of results. Those variables that may be identified easily and measured include: (1) Residual carbon (probably the most important influence); (2) temperature of steel; (3) slag, its consistency, viscosity, basicity; and (4) other residual elements that influence freezing phenomena.

When hot steel is poured from shank ladles into green sand molds, a small amount of excess deoxidizing element must be present to counteract mold gases that form when the steel solidifies. The quantity is governed definitely by individual plant conditions. Recognition should be given to the following important factors if troubles due to porosity occur.

At any given temperature and with a given slag, a lower preliminary carbon content than normal means a higher oxygen content in the steel. Increasing the temperature of the steel will increase the amount of oxygen to be counteracted later. Increasing the thickness of the slag or its iron oxide content has the same effect. Recarburizing exerts a weak deoxidizing influence but also removes dissolved gases such as hydrogen and nitrogen.

When steel is produced in an acid furnace, so-called *over-reduction* of the steel is frequently responsible for porous castings. Porosity in this case results from a reducing gas which, though soluble at relatively high temperatures, has separated from the steel at lower temperatures. Solubility of such gas is diminished by refraining from deoxidizing the slag to such a degree that the carbon arc reduces silicon from the slag. It is also inhibited by maintaining a high manganese content of the metal throughout the melting period and by working a lightweight rather than a heavy slag.

Almost any combination of deoxidizing elements in use in the industry will be found to give both favorable and unfavorable results, the essential difference being governed entirely by the starting point. An opinion widely held by many metallurgists is that the type of inclusions in any common type of steel indicates the tendency of the steel to hold gas in solution. Obviously, the inclusions—whether they are essentially silicates, sulphides or oxides—their distribution, and any influence they may have on the physical properties, are the result of melting practice, and are controlled mainly by the state of the steel at the starting point, plus final deoxidation practice.

Experiments performed at the laboratories of Union Carbide and

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Carbon Research Laboratories, Inc., illustrate some of these principles. Test heats were produced in 10-pound basic-lined induction furnaces where in most cases, the steels contained approximately 0.30 per cent of carbon, 0.50 per cent of manganese, 0.015 per cent of phosphorus, 0.025 per cent of sulphur, and 0.25 per cent of silicon.

Porosity and other detrimental effects attributed to the presence of gases in steel may often be prevented or ameliorated by suitable scavenging additions and by adjustments of composition, and of pouring temperatures. Fig. 22 shows the effect of increasing pouring temperatures of steel treated with hydrogen just before casting into an iron mold in such a way that mold gases could play no part. Although the porosity was marked at all pouring temperatures, it apparently was especially pronounced at the higher ones.

Fig. 20 shows how steel with an increased manganese content responds to similar hydrogen treatment. Here it is obvious that manganese is an important factor in reducing porosity due to this hydrogen treatment. Fig. 21 shows that an 0.80 per cent silicon steel tends toward solidity at nominal pouring temperatures, but that the silicon is ineffective in reducing porosity at relatively high temperatures.

Inclusions developed by adding increasing amounts of deoxidizers have been classified and are illustrated in Figs. 21, 22, 23, 25 and 26. Obviously, the examples given in Figs. 23 to 26 were produced by adding increasing amounts of deoxidizing agents to steel at the same starting point. Although specimens of steel usually contain several types of inclusions, the predominating types usually may be identified by careful examination.

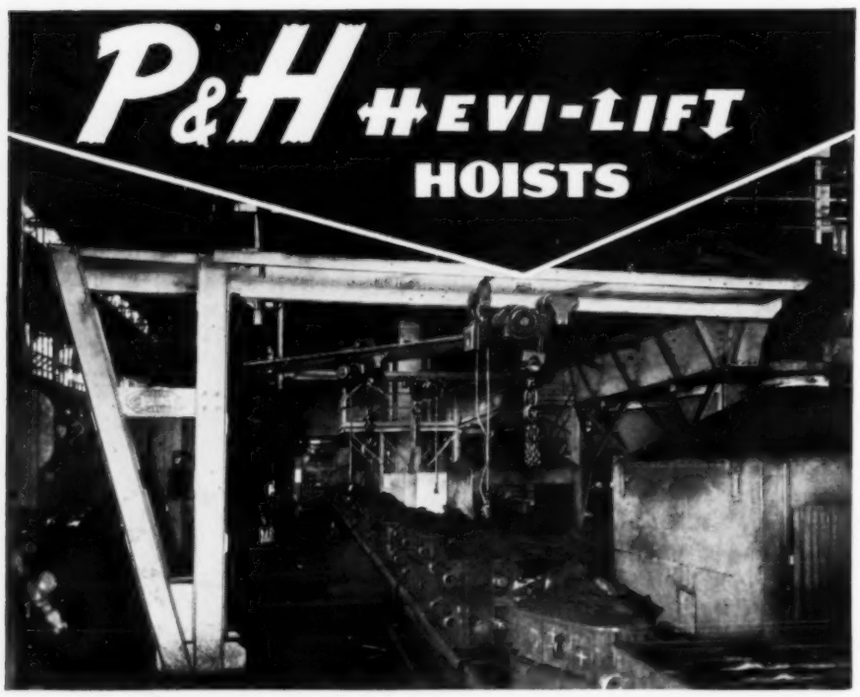
Fig. 28 shows roughly the proportions of the different types of inclusions that may be expected with increasing amounts of deoxidizing additions. These proportions are, of course, modified by variations in the amounts of residual elements at the starting point; for these elements, of course, influence the final condition of the steel. The other main factors affecting inclusions and characteristics are temperature and slag.

Deoxidizers Change Inclusions

Consider the face of the composite diagram: An increase from 0 to 0.35 per cent of silicon diminishes the proportion of intergranular ternary eutectic sulphide shown previously in Fig. 22, increases the proportion of round silicates shown in Fig. 23 but does not alter the proportion of round binary eutectic sulphides, also shown previously in Fig. 23 and again in Fig. 26.

With gradually increasing additions of aluminum or of zirconium, in addition to the 0.35 per cent of silicon, the proportions of the various types of inclusions change and are accompanied by a marked decline in the reduction of area and resistance to hot tearing of the casting, as shown at the bottom of the figure. Eutectic oxides (silicates) shown previously in Figs. 22 and 26, make their appearance here with an addition of approximately 0.075 to 0.10 per cent of aluminum while both continuous and disconnected intergranular ternary eutectics become a large proportion of the total inclusions with an addition of approximately 0.04 per cent of aluminum. These are shown in Fig. 22. Ductility of such steel is at a minimum.

It may also be noted, by proceeding on the diagram farther to the right, that with increasing additions of calcium (besides the other deoxidizers already added) it is possible to eliminate completely the eutectic oxide galaxies and the intergranular ternary eutectic (shown in Figs. 22 and 26), both of which lower ductility. However, a new duplex type of inclusion appears known as a



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peritectic oxy-sulphide (shown in Fig. 24) which does not lower the ductility of the steel.

Consider now the change taking place in the condition of the metal at the starting point, as indicated on the left, by decreasing carbon, manganese or sulphur in the analysis, and by shifting from the face of the diagram toward the rear. The proportion of oxide (silicate) inclusions increases with any addition of silicon. The same is true of the eutectic oxides or galaxy in the middle and right hand section of the diagram, but the intergranular eutectic sulphide is diminished.

It is believed that a decrease in the carbon, manganese or sulphur, is a definite indication of an increase in oxygen which, if carried far enough, eliminates any chance whatever for the formation of the intergranular eutectic sulphide. Similarly, high-temperature and oxidizing slags, rather than strongly reducing slags, are desirable because these additional factors help to obtain the more desirable type of inclusions.

In most instances the characteristics of steel, as well as cast iron, may be modified with ladle or very late furnace additions of combination deoxidizing agents. Of the various elements available, those containing calcium, manganese, vanadium, silicon, aluminum and zirconium are of special value.

Use of calcium alloys improves fluidity, yield point and distribution of inclusions.

Addition of manganese and zirconium counteracts the evil effect of sulphur, lowers the melting point of inclusions and decreases hot-shortness.

Vanadium improves yield point, decreases grain size, builds up shock resistance, and prevents inclusions from combining in galaxy formation.

Silicon is the best base for combination deoxidizers since it is essential in meeting the chemical specifications.

Aluminum deoxidizes, refines the grain, and enters solution readily. In combination with other elements, its use is recommended for light sections poured in green sand molds at high temperature.

This is the second and concluding article from a paper presented at a meeting of the Pittsburgh Foundrymen's association. The first appeared in the October issue.

THE EDITORS

American Management association, 330 West Forty-second street, New York, has issued a booklet covering, "Employe Relations Policies: How To Make Them Specific," by G. S. Hattersley, Sears Roebuck & Co. Copies may be obtained for 50 cents.

Book Review

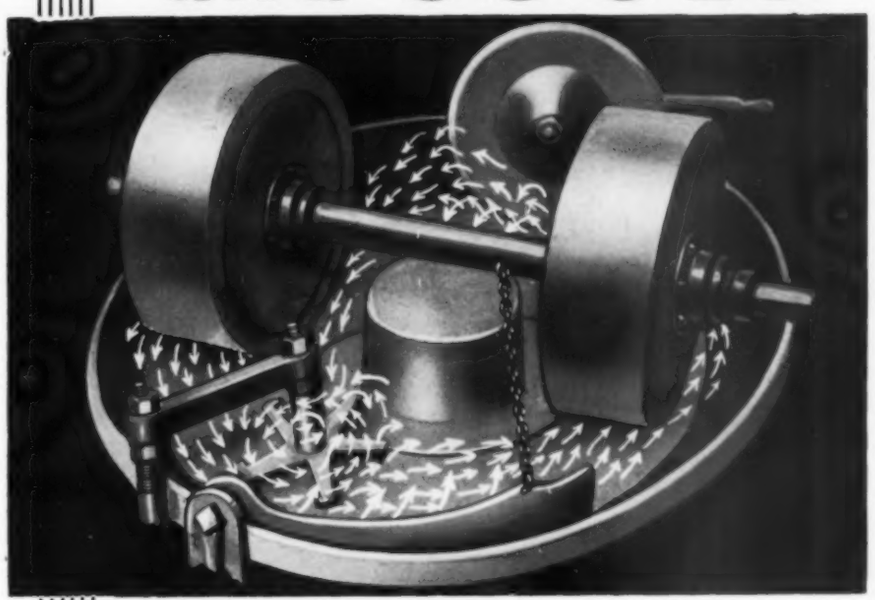
Scientific Price Management, by Allen W. Rucker, fabricoid, 22 pages 9 x 12, published by the Eddy-Rucker-Nickels Co., Cambridge, Mass., for $5.00.

The author of the book is president of the Eddy-Rucker-Nickels Co., counsel on marketing, sales and advertising. The book has been written for those who have pricing decisions to make—executives, sales managers, production managers, and trade association officials. Actual case studies of the author's firm give the reader a fairly complete guide to price problems. The studies range from simple price cuts to those involving advertising allowances, freights allowances and sales bonuses in addition to those dealing with added production required of factory employes. The book provides a means to determine volume increases under various conditions.

Dust Suppression

Faraday Engineering Co., whose new dust fume suppression unit was mentioned on page 88 of the September, 1940 issue of THE FOUNDRY, is located at 56 Clearway street, Back Bay, Boston, Mass.

it AERATES and COOLS



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CITIZENSHIP AND PERSONNEL

(*Continued from page* 39)

Peter E. Rentschler, Hamilton Foundry & Machine Co. were included in the membership of the military affairs committee of Hamilton.

Management of the Hamilton Foundry & Machine Co. has been very successful in correlating its own personnel relation work with the preparedness program, and especially with Americanism. The company provided a float for the parade, as shown in Fig. 1, which included a decorated truck carrying a submarine diesel engine block weighing 2775 pounds. The company held a drawing at noon on the day of the parade to determine the 40 employes privileged to ride on the float in the parade.

During the past year the company has prepared a number of letters for employes dealing with various phases of the Americanism program. On Armistice day, 1939 the company pointed to the advisability of all employes who were not American citizens to make application for citizenship. A few weeks later the D. A. R. *Manual for Citizenship* was distributed to all employes.

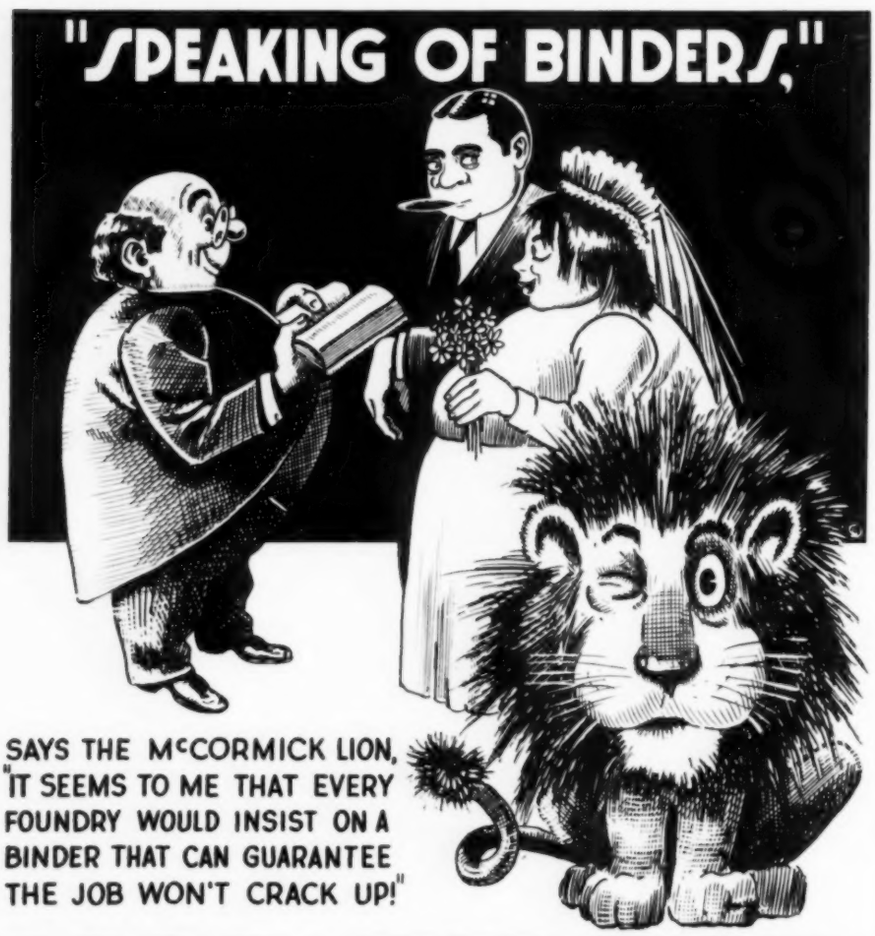
Other bulletins and letters continued to give information on citizenship to the employes of the company. In June of this year, the management pointed out that it would be necessary to establish to the satisfaction of the secretary of war and the secretary of navy the citizenship of each employe if the company was to anticipate army and navy work under the national defense program. Forms were provided to assist workers in obtaining birth certificates for all except those naturalized citizens who already had submitted citizenship papers.

A Federal bureau of investigation motion picture, "You Can't Get Away With It," exhibited to about 100 employes one evening in June, proved so interesting that a number of showings were scheduled to permit the families of employes to see the picture.

Hold Finger Print Parties

Perhaps one of the most interesting parts of the company program relates to the fingerprint parties held at the plant on June 26 and July 5. A bulletin to all employes announcing the several showings of the F. B. I. picture also announced that fingerprint experts also would be on hand to make finger print cards for personal identification purposes only. The cards, as announced, were to be sent to the civil identification section of the Federal bureau of investigation, department of justice, Washington, where they would be kept in files entirely separate from the criminal finger print cards. Because having finger prints on file provides a positive means of personal identification, the company recommended that each employe and the members of the family 10 years of age or older, have finger prints made. Interest in the party grew as the affair progressed, and many had prints made by Bertillon Sergeant Joe McFall of the Hamilton city police department, as shown in the accompanying illustration. Also, as shown, many of the spectators viewed the various display panels at the plant showing safety and hygiene activities.

A number of persons exhibited some hesitancy to be fingerprinted at the first meeting. As the employes and families wandered around the display rooms with the displays of safety devices and equipment employed by the company, and exhibits of various types of guns, revolvers, tear gas bombs, etc., supplied by the Hamilton police, they became more enthusiastic. A number who were not fingerprinted at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that time, expressed further interest and the company repeated the procedure on Saturday, Sept. 21. At that time several movies were shown, including those taken during the Hamilton preparedness parade; "Pleasure Time," showing the preparation of the nightly broadcast of Fred Waring's orchestra; and "Tobaccoland, U.S.A." giving a cross section of the national life in the South. All present were presented with a copy of "The American Patriot's Handbook," a 186-page booklet presenting the constitution, the flag and presidents of the United States.

J. Edgar Hoover, director of the Federal bureau of investigation, has written several letters complimenting the Hamilton Foundry & Machine Co. on the work it has been doing.

Book Review

An Occupational Survey of Molding and Foundry Trades; prepared under direction of city schools curriculum project Work Projects Administration; San Diego, California public schools; project superintendent, Jay D. Connor, assistant school superintendent. Paper; 25 pages; 8 x 11 inches.

This survey of the molding and foundry trades with particular application to the local San Diego area, is presented under 12 chapter headings and a 2-page bibliography: Definition, importance of industry, history, nature of industry, how a mold is made, qualifications and preparation, wages, growth of industry in West, present status of molding industry, San Diego survey, local demand for foundry workers, opportunities. The concluding paragraph states: "The foundry trades have much to offer. Whether the young man planning his future wants merely a permanent job, or one with opportunities for advancement, or one that may provide the necessary stepping stone for outside achievement, the industry is worth careful consideration." It compares favorably with opportunities in other fields.

Proposed Revision

The standing committee in charge of simplified practice recommendation R89-36, "Abrasive Products", has approved a revision of the recommendation which further reduces the number of stock varieties from 1868 to 1739 or approximately 22 per cent. Mimeographed copies of the proposed revision may be obtained from the division of simplified practice, national bureau of standards, Washington.

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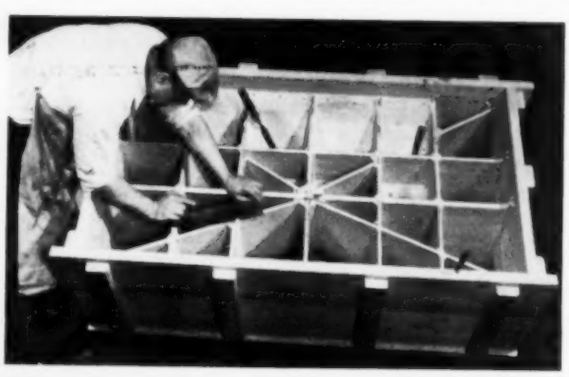

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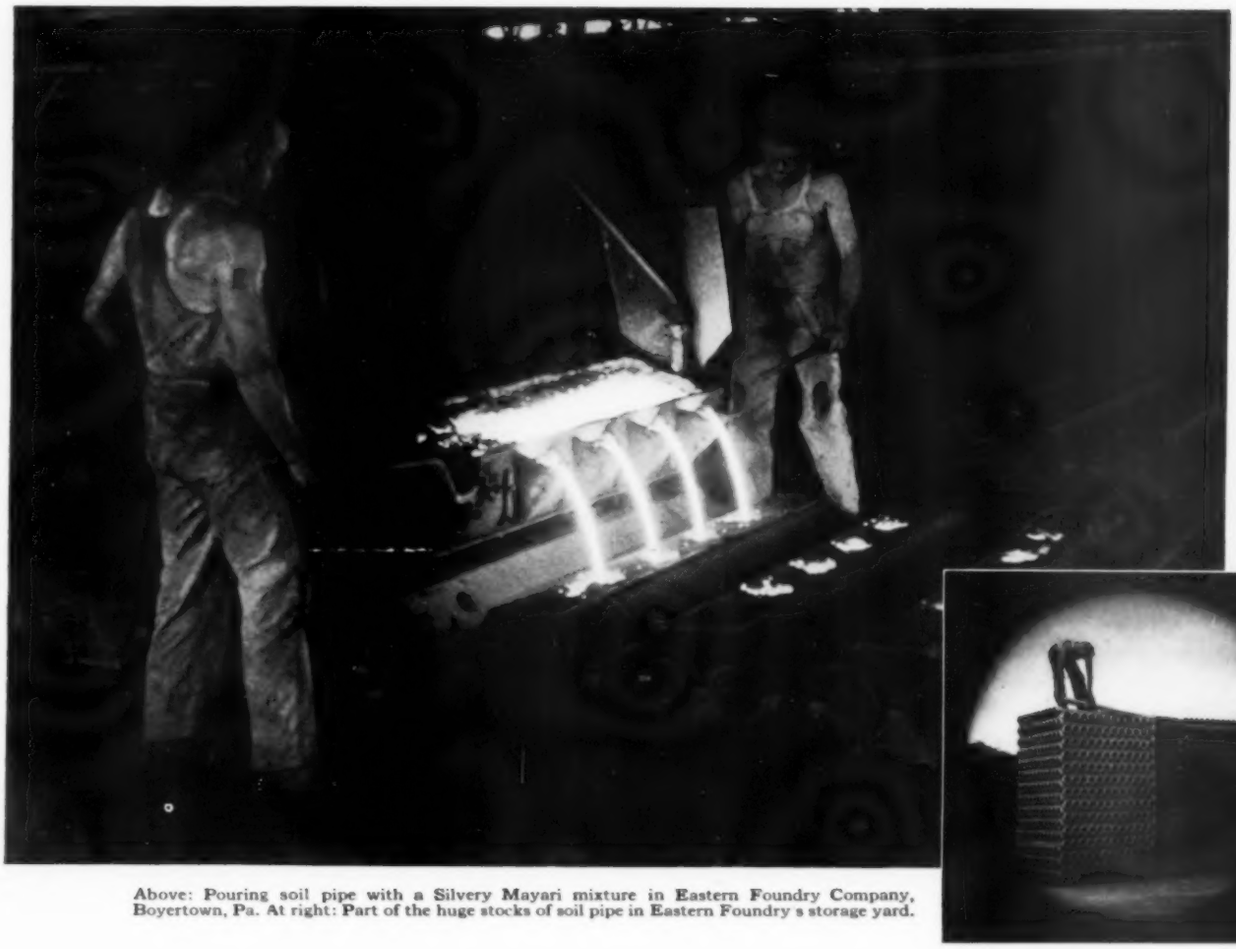


Above: Pouring soil pipe with a Silvery Mayari mixture in Eastern Foundry Company, Boyertown, Pa. At right: Part of the huge stocks of soil pipe in Eastern Foundry s storage yard.

If it's economical in soil pipe . . . you can use Silvery Mayari anywhere

Some foundrymen have the impression that Silvery Mayari is an expensive alloy iron to be used only in special quality castings. Nothing could be farther from the truth.

Consider, for example, the experience of Eastern Foundry Co., Boyertown, Pa. This foundry makes soil pipe, a casting selling in a highly competitive field. Naturally they must keep costs as low as possible.

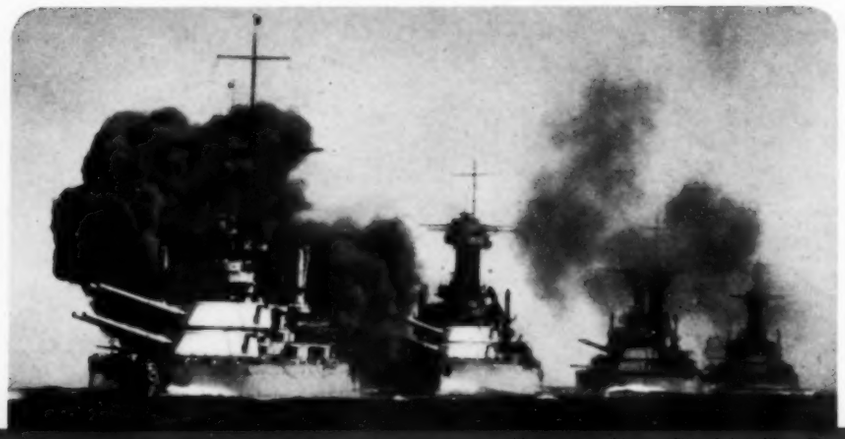
Yet Eastern Foundry uses Silvery Mayari in every length of soil pipe they produce. Why? First, because Silvery Mayari makes a stronger, less-brittle pipe. Soil pipe made with Silvery Mayari is less apt to split when chipped to length. It can be loaded or unloaded with less danger of breakage.

Second, this company uses Silvery Mayari to cut production costs. Reaming the rough pipe, formerly a long and costly task, is now both speedy and economical. In melting, Silvery Mayari distributes its silicon, manganese, chromium and nickel thoroughly in the molten metal. There are no segregations to cause hard spots, virtually no loss of the strengthening alloys. Furthermore, Silvery Mayari has unusually high percentages of manganese and silicon. As a result, steel scrap can be substituted for silicon-and-manganese-bearing pig iron. Often this means that Silvery Mayari alloy castings can be made for less than ordinary gray iron castings.

Why not investigate Silvery Mayari? There's no casting too intricate, no casting too simple for this natural alloy iron.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY



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